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THE AUTOMOBILE

DETROIT HAS A NOTABLY ARTISTIC SHOW

DETROIT, Feb. 17.—Once each year the Detroit Automobile Dealers' Association and local manufacturers tear themselves away from the strenuous task of supplying the rest of the country with cars long enough to demonstrate what a real automobile show is like. They're at it this week, and the pace set is one that will compel would-be competitors to throw in their high speed and then trail along in the rear. Frankly stated, there is no second to Detroit in the matter of appearances. New York's two shows were imposing affairs, as shows go. Chicago's exhibition, in spite of being overdone in some respects, was up to the usual high standard. But none of the three equalled in an artistic way the standard set by the Detroit association at its second annual show, held in the Wayne Casino.

This may seem like an extravagant statement, but it isn't. When Manager E. LeRoy Pelletier was associated with Fred Thompson back in those days that the Pan-American Exposition was in the making, he was given a valuable schooling in the advantage of "dressing up" an exhibit. He has been watching automobile shows ever since, and noting wherein they fell short from the viewpoint of the spectator. Pelletier was brimful of ideas when appointed manager of the local dealers' show a year ago, and in spite of the handicap attendant upon the inadequate quarters in which it was held managed to furnish surprises that long remained pleasant memories, in addition to making the show a financial success.

This year he was again given carte blanche, and with more than twice the space ever before at the command of the local show has provided a revelation. The first thing Pelletier did was to engage the services of Edward Wagner, a sculptor who won distinction with his work at the Pan-American Exposition. Wagner is a Detroiter, and put his heart into the task mapped out. The result is apparent.

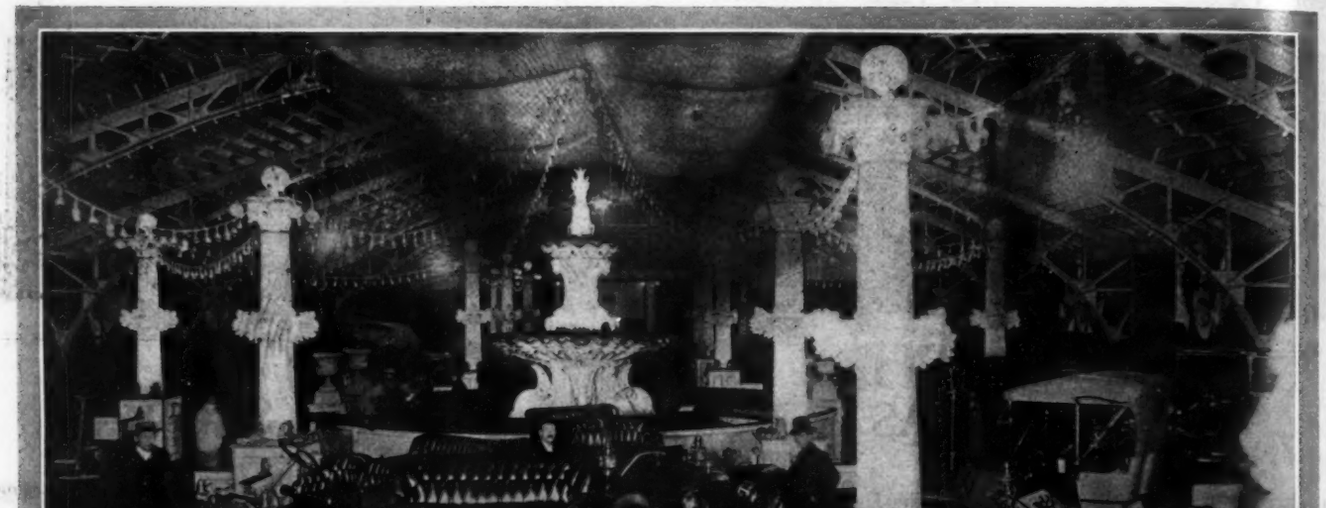
Expense was no object. It was the understanding that if necessary $10,000 might be spent for decorations. It was, too. As a matter of fact, when the show was thrown open to the public more than $11,000 had been expended in preparations. It is well worth every dollar it cost, though. In planning the exhibition the Detroit Association was not figuring on profits. It wanted to impress on Detroiters and the country at large what the automobile industry meant to the city—and it has succeeded most convincingly and at the same time artistically.

Both floors of the Wayne Casino have been utilized, and so cleverly have the arrangements been planned that one surprise follows another until the climax is reached on the second floor. Entering the Casino, visitors pass into the section set apart for accessories. Never lending themselves well to a harmonious arrangement, it has nevertheless been possible to place them so they show to good advantage in their segregation.

A few steps further on there bursts upon the spectator's view a scene that causes him to gasp with admiration. Stretching away seemingly for a half mile is a vista amid which the highly finished motor cars are singularly at home. Extending from one end to the other of the great hall is lattice work hiding much of the ceiling, and extending down the sides at regular intervals. Twined through this lattice is Southern smilax in profusion, giving an impression of midsummer in marked contrast to the season. The side walls are given over to great paintings representing scenes familiar to local motorists.

Down the hall extend four rows of latticed pillars, the centers of which are formed of colored glass with electric lights enclosed. Thousands of colored electric bulbs are strung about the ceiling and along the sides, and scores of cages containing canaries hidden among the smilax add to the summery effect.

On the second floor Sculptor Wagner was given a free hand to work out the ideas evolved by Manager Pelletier and himself, and the effect is highly pleasing. At the outset Manager Pelletier's cunning in planning illusionary effects is shown. Up a dead black staircase the visitors pass, and are suddenly confronted by heroic sized figures in staff depicting "The Spirit of the Automobile." Seated at the wheel of a car, the lower part of which is enveloped in dust, sits a man bare to the waist. Beside him sits a woman holding in her outstretched hand the palm of victory, while just ahead speeds an American eagle. The surprise is



General View of the Detroit Automobile Dealers' Association's Artistic Show.

complete, but it is only incidental to the general arrangement. In the center of the great auditorium rises a thirty-foot fountain of staff, twenty-seven feet in diameter at the base. The upper basin is supported by a half dozen mermen chauffeurs, faces set, muscles rigid, hands grasping steering wheels. Surrounding the fountain is an enclosure fifty feet in diameter, bearing at regular intervals the head and shoulders of a motoring girl done in staff. Here the thoughtfulness of these in charge of the show is evidenced, for the enclosure is designed as a resting place for the fair sex, upholstered seats extending entirely around the inside of the circle.

All the standard makes whose names have been familiar in the motoring world for years are much in evidence, comparison with the same cars of a few years since providing an interesting object lesson on the development of the industry since its inception. There are men among those present, too, who witnessed the birth of the industry, chief of them being Henry Ford, Detroit's pioneer automobile maker.

Accessories manufacturers are here in large numbers and are quartered at the west end of the main floor. The commercial vehicles are also housed in this section and are attracting much attention, as is the exhibit of motorcycles.

In spite of inclement weather the opening night witnessed a rush that made it difficult to handle the crowds even with the provision made. Every night has been a repetition of the opener and dealers are elated. Actual sales exceed all previous years, day for day, by a large margin, and from the inquiries made it is apparent that great numbers of Detroiters are in a hurrying mood.

Detroit Has Outdoor Show Idea.

One of the interesting bits of news coming out of this week's show has to do with making Detroit not only the automobile manufacturing center of the country, but the sales center as well. While those back of the movement decline to go into details, the general outline of the plan is to hold an automobile show and carnival in Detroit next August, at which time all the new models will be shown under conditions that are impossible at this season of the year. August is the month tentatively selected, and the State Fair Grounds the place where this novel exhibition will be held. The grounds are easy of access and there is one of the fastest mile tracks in the country upon which to demonstrate.

Michigan produces 60 per cent. of the automobiles made in America, representing 50 per cent. of the value of this country's output. Millions of dollars are invested in plants, and tens of thousands of men are given employment in the manufacture of motor cars. In Detroit alone 50,000 automobiles will be made this year. Why, then, argue those back of the plan for a midsummer exhibit here, should Detroit manufacturers be compelled to exhibit hundreds of miles from home at a time when agencies have been placed and every energy is being directed to filling orders.

Detroit and Michigan manufacturers who have been sounded on the proposition are enthusiastic. Detroiters who are just beginning to realize what the automobile and allied industries mean to the city are for it. The Detroit Automobile Dealers' Association, which has shown the rest of the country what a real show is like, is a unit in favor of the undertaking, realizing that it would mean the bringing to Detroit for a week of 10,000 to 12,000 agents and automobile enthusiasts, and give the city even greater prestige than it now enjoys.

List of Firms Exhibiting Cars.

The following is a complete list of firms in the Detroit association exhibiting. This, however, does not represent the full line of cars, as several of these concerns handle four and five different makes, while almost without exception two lines are represented:

E. M. F. Co.
Rapid Motor Vehicle Co.
Cartercar Co.
J. B. McIntosh Auto Co.
Rumsey Electric Co.
Maxwell-Briscoe-McLeod Co.
American Electric Auto Co.
Grant Bros.
Regal Motor Car Co.
Wm. F. V. Neumann Co.
Coombs & Gilmour.
Cadillac Motor Car Co.
Seidler-Miner Co.
Anderson Carriage Co.
Ford Motor Co.
Brush Runabout Co.
Olds Motor Works.
J. H. Brady Auto Co.
Winton Motor Co.
J. P. Schneider.
W. S. Isbell.
Buick Motor Co.
Standard Auto Co.

This list does not include the power wagons or accessories manufacturers and dealers, of whom there are many.

For the success of this year's show, in addition to their own efforts, the Detroit Automobile Dealers' Association can thank Manager Pelletier, and George Lane, president; John P. Schneider, vice-president; Robert K. Davis, secretary, and J. H. Brady, treasurer, who have worked untiringly for the good of the cause.

ST. LOUIS SHOW HAS BLIZZARD BEGINNING

ST. LOUIS, Feb. 15.—Struggling with a blizzard of no mean proportions, the exhibitors at the third annual show of the St. Louis Manufacturers' and Dealers' Association had some difficulty in getting their cars to the Coliseum in time for the opening to-night, but were in the end successful. In spite of the difficulties of transportation and of walking in the streets, a goodly number of automobile enthusiasts were present, and were immensely pleased with what they saw.

This, the first show held in St. Louis under the management of a committee from the Manufacturers' and Dealers' Association, might be classed with the greater of the minor shows, although it is the first time that a St. Louis exhibition has merited the classification. Approximately 130 cars are displayed by some forty exhibitors. The figures are more than double those of last year or the year before, when the show was held at the Jai Alai Building in the West End.

A large part of the show—at least nearly 30 carloads of automobiles—came from the Chicago show. Nineteen of these cars came by fast freight in an automobile special. Six more were sent by a special express running on passenger schedule, and one car was attached to a regular passenger train. The distribution of these machines at the Coliseum began as early as Sunday afternoon, and by Monday morning early the cars in the 19-car load shipment began to arrive at the Coliseum and at the same time snow began to fall, which had increased by night to a blizzard. If there had been any motor trucks available for the transportation of the automobiles from the freight yards to the Coliseum there would probably have been no difficulty, but most of the machines were hauled by horse-drawn wagons which had trouble with the snow. To overcome the difficulty many of the machines were dismounted from the sluggard wagons and run under their own power.

The only car shown here for the first time was the Frayer-Miller, which did not appear at either of the New York shows or the Chicago show. Besides several pleasure cars, a Frayer-Miller truck without body was exhibited.

The local dealers, some of them handling several makes of cars, exhibited as best they could and were in nearly every case ably assisted by their factories. The several local manufacturers, including the Moon Motor Car Company and the Dorris Motor Car Company, gave about the same exhibits that they had at the Chicago show, although the Moon was slightly limited for space here. It is said that the Moon cars that were to have been brought back from Chicago were sold at the Chicago show by a new agent demanding immediate deliveries, and the St. Louis exhibit had to make up from cars in stock at the factory.

To have the decorations complete, Chairman John J. Behen and acting manager, Lloyd Rickert, worked all through Saturday night and Sunday without sleep, but the result was worthy of their trouble. The illumination was particularly good—as it not always is at auto shows.

Besides the attraction of the 1909 cars, many of them shown in St. Louis for the first time, the management provided motion pictures of the Savannah Grand Prize Race and the Grand Prix at Dieppe. At one end of the auditorium the mammoth Gabriel horn was played, while at the opposite end of the building a large band helped to make things lively.

A large list of cars never exhibited in St. Louis before were on view, including the following: Darby and Victor, made in St. Louis; Stoddard-Dayton, Mitchell, Overland, Atlas, Woods (electric), Oakland, Franklin, Rambler, E-M-F, Studebaker (gasoline), Jackson, Regal, Stanley (steamer), Detroit (electric), Marmon, Chalmers-Detroit, Cadillac and Frayer-Miller. The

Installing the Exhibits of the St. Louis Automobile Show in the Big Coliseum.

Locomobile and Apperson cars, handled by the Capen Motor Car Company, were exhibited at the Hotel Jefferson.

The complete list of exhibitors follows:

MAIN FLOOR.

Peper Automobile Co.
Moon Motor Car Co.
Union Electric Car Co.
John Deere Plow Co.
South Side Automobile Co.
Park Automobile Co.
Victor Automobile Mfg. Co.
Doyle-Curran Motor Car Co.
Weber Implement Co.
Delmar Motor Car Co.
Swingley Motor Car Co.
Bagnell Automobile Co.
Van Automobile Co.
Maxwell-Briscoe M. V. Co.
C. F. & J. R. Brown.
Mississippi Valley A. Co.
Colonial Automobile Co.
Buick Motor Co.
Halsey Automobile Co.
Western Automobile Co.
Ford Motor Co.
Dorris Motor Car Co.

ANNEX.

Henderson-Willis Wld. Cut. Co.
J. Curtis Barcus.
Olds Motor Works.
Phillips Automobile Co.
Woods M. V. Co., W. C. Lewis.
Darby Motor Car Co.
Felix R. Chaudet.
Hurck Motor & Cycle Co.
Vehicle Top & Supply Co.
Success Auto-Buggy Mfg. Co.
Dorris Motor Car Co.
T. B. Jeffrey & Co.
Electric Auto & Battery Co.

ACCESSORIES

Behen-Faught M. C. Equip. Co.
Phoenix Auto Supply Co.
Tamm Oil Refining Co.
West St. Louis Mach. & Tool Co.
T. L. Horn Trunk Co.
Traveler's Insurance Co.

BUFFALO SPORTSMEN'S SHOW PLANS.

BUFFALO, Feb. 15.—Under the auspices of the Buffalo Launch Club and the management of Dai H. Lewis, the Annual Power Boat and Sportsmen's Show, which will be held for a week beginning with March 8, is promised to Buffalonians as a "spectacular revel, replete with many amusement features." Manager Lewis has placed no limit upon the expense necessary to make it a success and has embodied many new points in decorations, equipment and in the quality of the exhibits.

In the matter of decorations, he will "provide a perfume effect by lavish use of hothouse flowers, a forest effect of trees in staff, with a wild animal and ornithological display in their branches, and an electrical effect which will throw a brilliant dazzle over all," according to Dai. Many applications for space have been received.

ALL READY FOR NEWARK'S SHOW.

NEWARK, N. J., Feb. 16.—Everything is ready for the opening of Newark's Second Automobile Show in the Essex Troop Armory on Saturday. Workmen have been engaged all week in the laying of the floor, and the decorators have practically finished draping the armory building in the National colors. Every inch of floor space has been taken, and the show will be a very representative one. There will be about thirty different makes of cars on exhibition, and included in the list will be the Acme, Brush, Cadillac, Chalmers-Detroit, Ford, Crawford, Fiat, E. M. F., Grout, Jackson, Isotta, Kissel-Kar, Locomobile, Marmon, Maxwell, Mitchell, National, Oldsmobile, Overland, Pennsylvania, Pierce-Arrow, Peerless, Premier, Rambler, Regal, Reo, Stevens-Duryea, Stoddard-Dayton and White.

There will be about 75 or 80 cars on view during the week, aside from a complete line of accessory exhibits. An elaborate program has been arranged for the week, which will include music every afternoon and evening and a moving picture exhibition every night.

The show will be opened by George E. Reeve, president of the Newark Board of Trade, who will deliver an address from the balcony of the armory building at 8 o'clock Saturday night. This address, which will open Newark's biggest and best automobile show, will for that reason be of absorbing interest to those present. It is expected that society will turn out "en masse."

Wednesday night will be set aside for the New Jersey National Guard and will be termed "Troop Night." Thursday night will be "Club Night," and the show will be attended by members of the various automobile clubs of New Jersey. On Friday night the show will be attended by the New Jersey automobile dealers. There will be several meetings of automobile clubs during the week, the most important of which will be that of the Associated Automobile Clubs of New Jersey, which will be held at the show on Thursday evening, when legislative matters will be discussed.

BLUE BOOKS FOR 1909 WILL MEET ALL REQUIREMENTS

THE assurance with which various clubs, leagues, and associations prognosticate future usefulness and unblushingly appropriate what has been done by others, is paralleled only by a vivid and optimistic imagination of the temperature of the tide undulating under the serene and soliciting sunshine of the month of May, which invitingly says, "Come in; the water is warm."

For the information of the tourist who may not desire to personally test the temperature of the ebb and flow of these multitudinous tides promulgated solely for his benefit, but incidentally to sustain an ebbing financial situation, an accurate and timely thermometer should be a valuable instrument.

Whatever is of assistance to the automobile tourist, whether of public or private origin, is to be commended, but he must not be misled either by the promise of doing in a day what requires months of laborious effort or by captious criticism of what has already been accomplished to the satisfaction of many thousands of automobilists.

Even "The Official Automobile Blue Book" did not at first contemplate the enormity of the undertaking when, several years ago, its publishers began the work of authentic road directions, and, while equipped with every facility and enjoying the cooperation of every club and thousands of motorists, it was still found necessary to travel by automobiles equipped with editors experienced in writing road directions and expert draftsmen with ready pencil to sketch intricate places from which hundreds of outline maps could assist the descriptive text.

The "Blue Book" began its work in 1903, since which time it has been issued annually, no expense having been spared to make each succeeding edition complete, authentic, and timely as to the modifying conditions of each season. The 1909 edition, the first section of which is now on the press, will consist of four volumes, covering respectively (1) New England, reaching into New York State; (2) New York, reaching the Middle West; (3) New Jersey, Pennsylvania, and the South; (4) Chicago and the Middle West, comprising 2,642 pages of text, assisted by 700 outline maps, all strictly originally constructed and executed. The text, besides carefully prepared directions from notes made from an automobile on the spot, contains largely cyclometer reading of distances and useful information of reliable hotels, garages, and matter of general interest. Upwards of 100,000 miles covering main trunk lines have been thus accurately recorded, with changes from year to year covering local conditions, until the "Blue Book" work has become the recognized authority in all localities east of the Mississippi and has unwittingly formed the groundwork of many club touring sections dependent on it for its information, and numerous imitating competitors, who copied even the errors it contained.

Meantime the "Blue Book," unheralded by flaming prognostication or competitive organization, is *per se* a wholesome supply of authentic information for tourists in the territory covered, which is available to the public generally, without red tape or trapping, as a strictly private enterprise on a basis of minimum expense for actual service rendered.

While the "Blue Book" does not predict its future or cast a horoscope for others, it is proud of the work it has already accomplished, and is fully satisfied that its efforts have been and will be appreciated. The "Blue Book" series come from the Class Journal Company, 231 West Thirty-ninth street, New York, and 1200 Michigan avenue, Chicago.

CHICAGO'S SHOW RESULTS IN PLENTEOUS SELLING

CHICAGO, Feb. 13.—The big Chicago Show which to-night came to a conclusion supplied a total of business done never before equaled by an automobile exhibition in this metropolis of the West. Of course, figures of all kinds are current in regard to the sales accomplished, but a conservative estimate of the grand total involved in cars purchased directly or indirectly as a result of the show would reach a mark not far from two million dollars.

"It is my judgment that the sales averaged ten cars for each exhibitor," said Manager S. A. Miles, "although it is impossible as yet to give anything like definite figures."

In the matter of attendance something close to one hundred thousand people undoubtedly passed the entrance doors of the Coliseum and First Regiment Armory. A study of the throngs that attended made apparent the fact that many had come from quite a distance in order to get a look at the 1909 products of both licensed and unlicensed manufacturers.

That a national show of this character is satisfactory to the average buyer was plainly apparent. It has been suggested in regard to New York another year that one show follow immediately upon the heels of the other, and perhaps be held in the same building. This plan would permit people to attend the last few days of the first show and also attend the succeeding exhibition. Much comment in favor of such a plan has been heard in Chicago, and it is not improbable that something of the sort may be arranged. This would permit accessories makers to exhibit at both shows with lesser expense and greater convenience to themselves. It is understood that efforts along this line have been discussed.

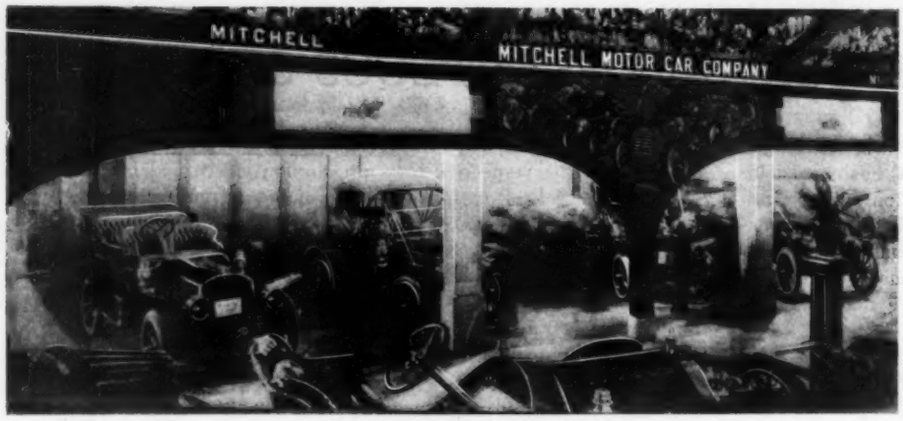
Among other subjects considered at the two days' conference of the traffic managers of automobile factories during the Chicago Show was the question of suitable freight cars for automobiles. The facilities of the railroads are being taxed more and more by the increasing output of the automobile industry and the traffic managers of the respective lines are anxious to provide freight cars that will secure for them a portion of this attractive business.

General Traffic Manager J. S. Marvin, of the National Association of Automobile Manufacturers, presided at the meeting, and pointed out the necessity of arriving at a uniform recommendation to the railroads so that the new freight cars built for this purpose would suit the requirements of all factories. The meeting recommended the double side-door plan of box car, which gives an opening ten feet in width and nine feet or more in height, placed diagonally opposite each other in the car. Such doors permit the loading of the largest machines. For double-decking purposes, that is, the loading of an extra tier of machines above those on floor, car should also have one end door ten feet square. This double-decking is accomplished by means of a skeleton work of timbers, and the plan is coming into favor for shipments of the smaller class of machines long distances, where the freight rates are high and where the minimum weight charged by the railroads is considerably in excess of the actual weight that can be loaded on the floor of the car only.

It was found impossible to recommend at the present time any one length of freight cars, owing to the fact that the railroad companies in the different parts of the country have conflicting rules as to minimum weights on cars of different lengths. For shipments to the Pacific Coast 50-foot cars are in demand. Other sections of the country 36-foot cars are favored, owing to the fact that a penalty in the shape of higher minimum weights is assessed by the railroads on longer cars.

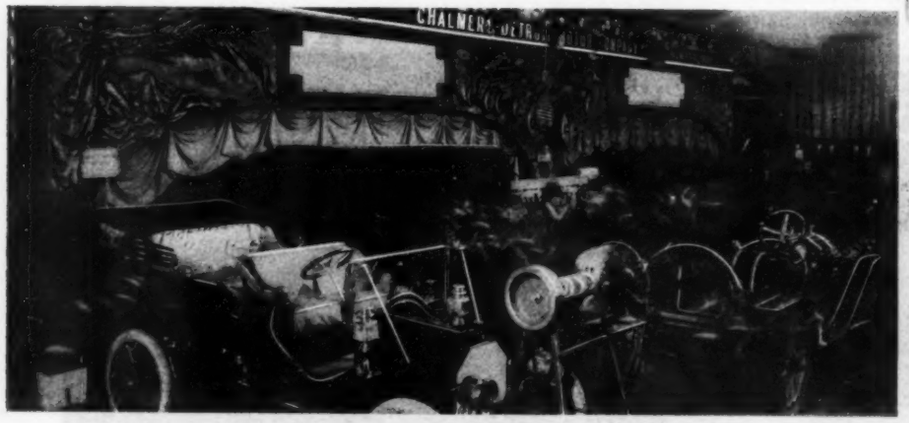
An arrangement of particular interest to the Pacific Coast trade was effected whereby G. F. Detrick, chairman of the Automobile Trade Association of San Francisco, will, in connection with similar trade associations in other Pacific Coast cities, act as the Pacfic Coast branch of the National Associa-

Thomas 6-70 Flyer, Midwinter Record, Denver to Chicago; Distance, 1,400 Miles; Running Time, 114 Hours.



Mitchell Thirty, with Magneto Ignition, in the Foreground.

Pennsylvania with a Model D-25 Selective Three-Speed Shaft Drive.



Chalmers-Detroit Thirty with En Bloc Cylinders.

Oakland Thirty Roadster with Thermo-Syphon System of Cooling.

tion's traffic department. It is expected that this arrangement will result in bettering the shipping conditions as they now exist with respect to that territory.

Record Run of a Thomas.

The Thomas people made considerable capital out of the finish of the Denver-Chicago record run of Wesley Smith, who wound up his trip at the Coliseum at 8:10 o'clock Wednesday night. Smith had smashed the Denver-Colorado Springs record in a Thomas six, cutting eight minutes off the old mark, and, enthusiastic over this, he decided to try for a mid-winter mark to the Chicago show. He left Denver at 1:15 o'clock Wednesday afternoon, February 3, being accompanied by A. E. Blanchard from the Thomas factory, James McDonald, a mechanic, and two newspaper men. The roads were in frightful condition because of the frozen mud, but by 9 o'clock Thursday night the car had reached Julesburg, Col. Omaha was made by 6 o'clock Saturday night. The Iowa roads were worse than the ones in Colorado. The gumbo mud forced the crew to work for hours at a time with block and tackle to get through. At one place the car broke through the ice crossing a river and it took twelve hours to get it out.

"From this point on it was even worse," said Smith, in describing the run. "Instead of getting better, the roads became worse, and when we reached the Illinois line we struck the terrible blizzard of the 7th and 8th. The intense cold and driving sleet forced us to seek shelter for the first time or perish with the cold. We arrived at Morrison, Ill., at 12 o'clock February 8, but after stopping a few moments we again took to the road and managed to reach Sterling, where we were compelled to rest. Leaving at a late hour Wednesday, we bucked the snow drifts and managed to reach the Coliseum at 8:10 o'clock.

"The total distance between the two cities is about 1,400 miles, which we made in 114 hours actual running time. We were in bed only two nights, the balance of the time taking turns sleeping in the tonneau. We came through without a replacement. Our car is a 70-horsepower six-cylinder, and was completely equipped except that we had no top.

"This car and driver also hold the record between Los Angeles and Goldfield, Nev., of 20 hours, but the trip from Denver was the hardest it has ever made because of the road conditions. We covered some of the distance that will be on the Glidden tour route next summer if it goes to Denver, but if dry weather favors the tourists there should be little of the trouble that was experienced in midwinter. We also tried some of the rules proposed for the transcontinental race, that of sleeping in the tonneau, and found that it could at least be done successfully, but there was little rest secured. The fact that it took three days to cross the State of Illinois alone is an illustration of the difficulties encountered.

APPERSON IGNITION PATENTS.

By VICTOR LOUGHEED.

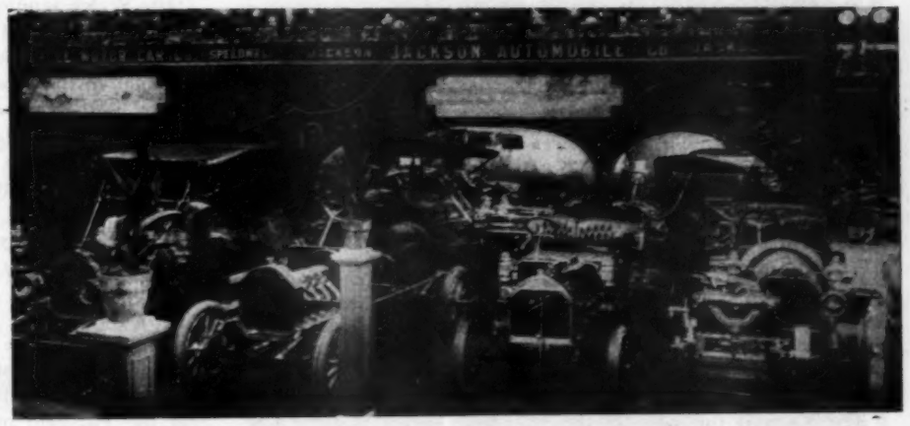
CHICAGO, Feb. 15.—There was much talk during the Chicago show concerning the Apperson patents on double ignition, which are claimed by the Apperson interests to cover basically every possible system in which two or more spark plugs are used. It is not claimed that the dual ignition systems, in which appears one set of plugs in combination with a double current source, infringe, but that some sort of a fight on the others is in the air can scarcely be doubted. Already a number of manufacturers admit having received infringement notices while the Apperson people stoutly and openly defend their position.

Among the very considerable numbers of offenders there is a variety of attitudes. Some of the more timid appear secretly worried to such an extent that it will not be surprising if in the near future several manufacturers that had decided double ignition to be good should decide on second thought that the simpler system is better after all, and revert to it forthwith. Others preserve a non-committal attitude to the extent of flatly refusing to discuss or opinionate on the subject. And, finally, very numerous indeed are those who discount the claims of the Kokomo pioneer and declare that they are waiting for him to attempt his worst. Bartholomew, for example, builder of the Glide, exhibited a three-cylinder casting made by him for Charles E. Duryea in 1894, in which appears provision for jump spark in addition to the regulation make-and-break ignition used on the stock machines produced by the Reading man. Duryea himself is outspoken in his opinion that the Apperson device was too long anticipated to be made the subject of a valid patent, while there are even those who whisper that a search of European stationary-engine practice will reveal double-ignition employed as early as twenty years ago. Patent sharps, too, suggest that the Apperson claim only purports to cover simultaneous ignition at two or more points within a cylinder, and, therefore, has no bearing on the mere provision of double systems adapted to use in alternation rather than in conjunction.

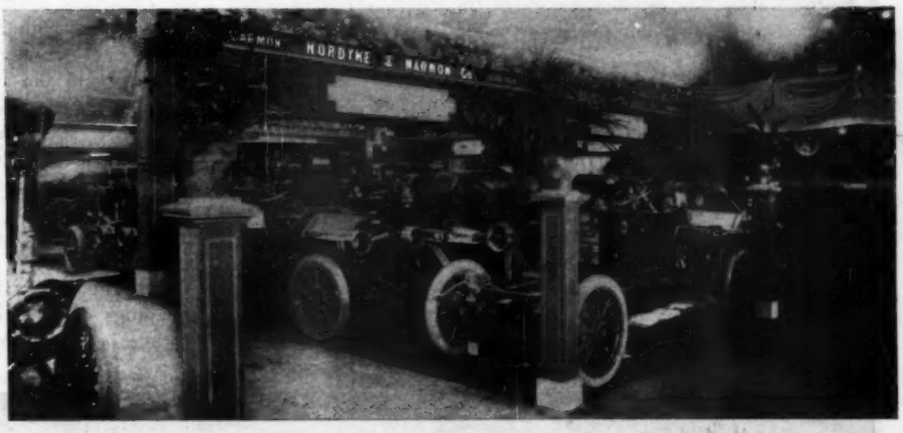
It at least admits of no doubt, should the courts sustain the Apperson claims, that a very fat slice of automobile profits for a while will trend Kokomoward, until back royalties are settled and ignition systems reorganized. This is sufficiently evident from a consideration of the threatened infringers, whose numbers and standing as strongly attest the popularity of double ignition as their more or less outspoken disapproval attests the unpopularity of the attempt to monopolize it.

In the Stoddard-Dayton cars one side of the system derives its current from a Bosch high-tension magneto, while the other secures it from a six-volt storage battery, worked in conjunction with a standard multi-vibrator coil of well-known make.

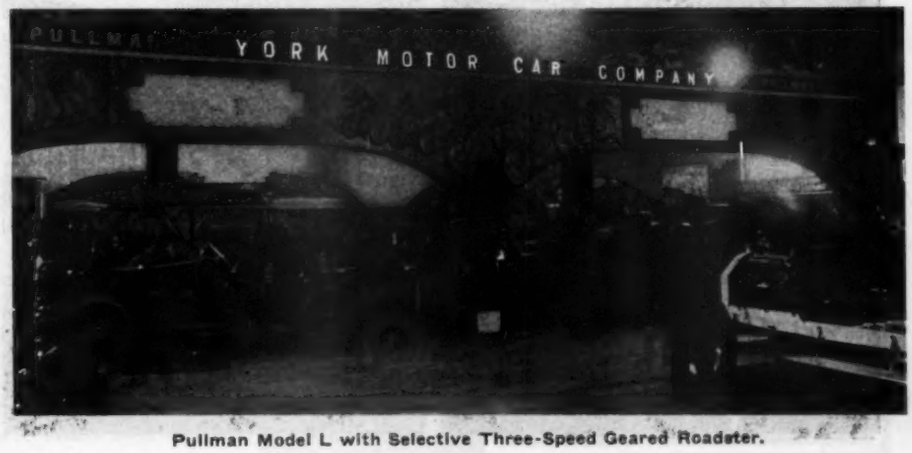
Atlas Two-Cycle Model F Is Fitted with Atwater-Kent Ignition.



Jackson Model H Is the Center of Interest, Especially the Roadster.



A Sea of Originality with a Runabout to Whet the Interest.



Pullman Model L with Selective Three-Speed Geared Roadster.

The same system is used in some of the Rambler models, except that a Splitdorf single coil with master vibrator is employed, and that the eight plugs are in the eight valve caps.

Another example of the same general type appears in the Oldsmobile, in which the Bosch magneto and six-volt storage battery are in combination with a multi-vibrator Heinze coil, with the plugs through the valve caps.

The big Austin cars employ a Splitdorf magneto, and, on the battery side, six dry cells with a Splitdorf master-vibrator coil. The spark plugs pass directly through the cylinder heads.

Special interest attaches to the Haynes scheme, this car being turned out by Apperson's former associate. Moreover, in the particular feature in question it practically duplicates the Apperson, Bosch high-tension magneto, six-volt storage battery, and two plugs paired through each intake valve cap being the details in common. In the Haynes, however, a single coil with master vibrator is favored.

Pierce cars have one set of plugs in the cylinder tops and one in the inlet valve chambers, with Bosch high-tension magneto on one side of the system and six-volt storage battery on the other. Separate vibrators in the Autocoil pattern are used.

The Premier construction involves primarily the Bosch low-tension magneto with the mechanical make-and-break through the inlet valve caps. The alternative system, worked from a six-volt storage battery through a Pittsfield distributor and single coil, connects to plugs in the sides of the inlet-valve chambers.

Bosch high-tension storage battery, and Splitdorf coil tell most of the Bartholomew story. The eight plugs are in the eight valve caps. The two systems can be used together.

In the Corbin cars, the purchaser is offered the alternative of Bosch high-tension or low-tension magnetos and plugs, with a six-volt storage for the battery system, in conjunction with a Connecticut multi-vibrator coil. Each plug is in a valve cap.

The Knox is the same as the preceding, except that the low-tension option is not given.

In the Lozier, the eight plugs are in the eight valve caps, with a Connecticut master-vibrator coil on the battery side. Otherwise the specifications are the same as in the other high-tension Bosch and six-volt storage battery systems.

Bosch, Eisemann, Splitdorf, or Dow at the extra price is the range of options in high-tension magnetos offered by the Cadillac people in their new model. The regular equipment, on the battery side, is six-volt storage, with Jacobson & Brandow multi-vibrator coil. Plugs are in the valve caps.

A storage battery with Leavitt distributor and Bosch high-tension magneto constitute the combination approved by the National. Plugs are in valve caps.

The two-cylinder American Simplex is the first of its type to appear with duplicate ignition. Bosch high-tension magneto, six-volt storage battery, Heinze multi-vibrator coil, and plugs through the cylinder heads constitute essential specifications.

Stevens-Duryea uses Bosch and storage battery in combination with multi-vibrator Pittsfield and Connecticut coils, the plugs being in the valve caps.

A double system of rather unusual but of some years' standing is the combination of dry cells and Bosch high-tension magneto in the Thomas cars. The Atwater-Kent device keeps down current consumption on the battery side. The plugs are in the valve caps.

The rechristened Toledo cars tie to the all but invariable Bosch high-tension magneto and six-volt storage battery. The coil is Splitdorf multi-vibrator, and plugs are through cylinder walls.

Dependence mainly on the Bosch high-tension system is evident in the big Stearns model, in which the alternative Connecticut multi-vibrator coil takes its current from dry cells. The plugs are slanted together in pairs in the inlet valve caps.

The Welch ignition is the same as that of the Toledo, except that the Connecticut multi-vibrator coil is offered as an option, and the plugs are close together in the cylinder heads.

Similar to the foregoing is the Pullman system, except that in the coil is the Connecticut master vibrator. The magneto plugs are in the cylinder heads and battery plugs in inlet valve caps.

The plugs each in a valve cap, the use of dry instead of storage cells, and the fitment of a Pittsfield multi-vibrator coil are the only important differences between the Speedwell and the preceding ignition system.

Lambert cars carry the Remy magneto, six-volt storage battery, and Kingston multi-vibrator coil. The plugs are in the valve caps.

The Mora scheme is the same as that of the Speedwell, with the substitution of storage for dry battery.

Moline ignition differs from that of the Speedwell only in that the Pittsfield master vibrator coil is provided.

The Halliday cars are equipped like the Moline, except that the Pfanstiehl multi-vibrator is on the dashboard end.

In the six-cylinder engines of the Fort Pitt Motor people, a Connecticut six-vibrator coil with six-volt storage battery is on one side and the Bosch high-tension on the other. Plugs are paired in inlet valve caps.

Another "six" is the Ricketts with U. & H. magneto, dry cells, master vibrator, and plugs in opposite sides of the cylinders.

Only the 50-horsepower car of the Marmon line qualifies in the double ignition class. It has Bosch high-tension magneto, dry cells, Heinze multi-vibrator coil, and two plugs in each inlet valve cap.

The Auburn arrangement almost duplicates the foregoing, but the plugs are distributed one to the valve cap, and a six-volt storage battery is preferred to the dry cells.

Three Characteristic Accessory Stands that Attracted Much Attention at the Chicago Show.

TREND IN TRANSMISSION PRACTICE

By Thos. J. Fay

Chapter III

IT is not enough to have in hand physical properties of the steel if it is true that the results are to be of the greatest possible magnitude. The steel should be investigated from the several points of view and an attempt should be made to locate the limits of utility very definitely. As a good aid to the process it is well to heat treat the steel in divers ways, and if a microscope is not available, have photomicrographs taken of the steel under the several conditions. If the steel can be viewed under a microscope at about 350 diameters, it will be possible to arrive at a very substantial conclusion as to the respective physical characteristics of the structure.

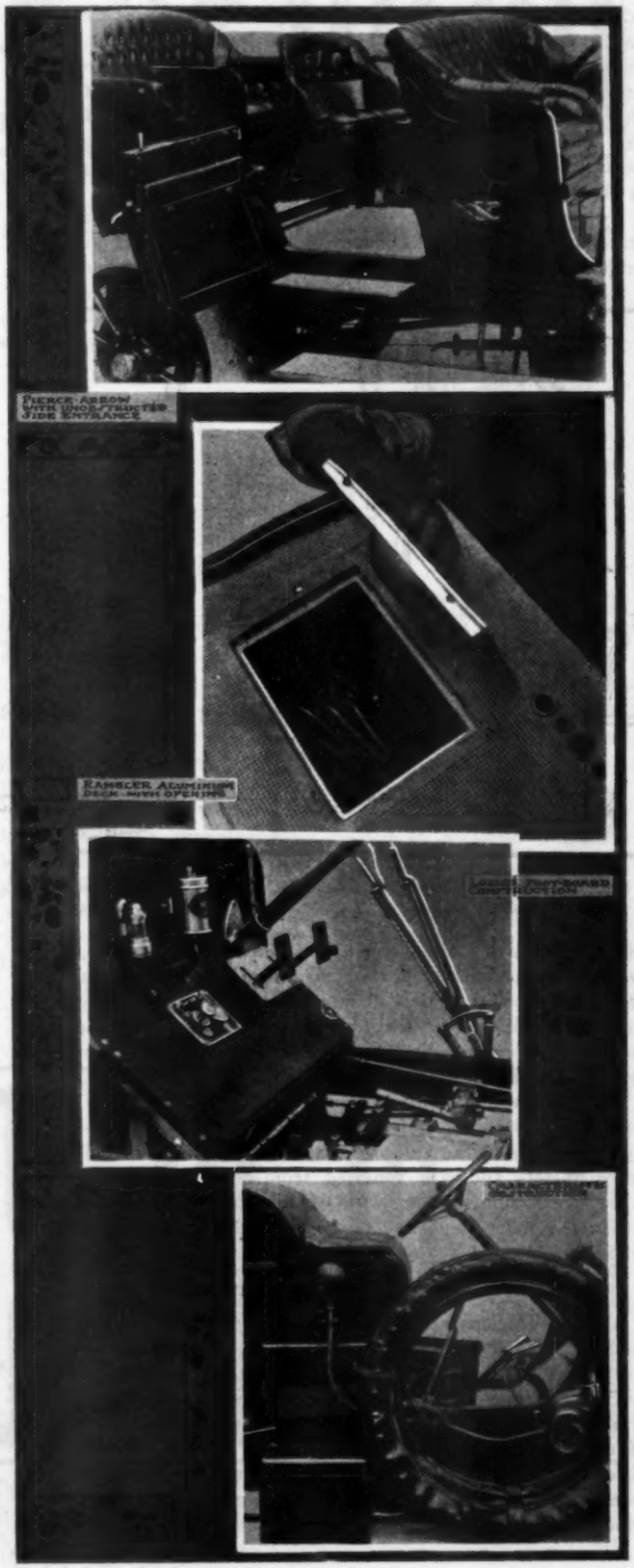
In this class of work, as in everything, it is pretty nearly sure that if the steel looks good it is good. It will be shown in this article that the structure of the steel changes as the heat treatment is altered, and an attempt will be made to illustrate the fact that it is the structure that looks close and uniform under the microscope that is the structure to depend upon in general practice. The only reason for thus entering into this phase of the subject is to assure the interested reader of the fact that it will be unnecessary to hesitate to take an interest in this phase of the subject, giving as a reason the fact that it is rather deep water.

Closer acquaintance with the appearance of structures will come in time, and as the structure unfolds to the eye of experience the story will broaden and the benefits will multiply. In the meantime there is no denying the fact that the benefits that will follow even crude attempts are well worth while. Take, for illustration, the photomicrograph H-5, which is of chrome nickel steel, and it is plain to be seen that the structure would hold out little promise by way of shock ability. Compare this structure with H-4 of the same material, and it will be seen that in H-4 there is no indication of the whitish zones characteristic of "burnt" steel.

Both of these specimens were of the same material, both were treated in the same way, but the specimen H-4 was carefully heat treated, while the specimen H-5 was allowed far too much liberty in the process, and it was reduced to the level of no value, in that it was "burnt." Both of the specimens belong to the brand of chrome nickel steel marked BND in the table of steel products to set before the designer. The notched bar test of this steel in the treated state, with a structure as shown in H-4, was given as 360 foot-pounds (Fremont). The same steel "burnt," as shown in H-5, would not be worth recording. Under these circumstances it is plain to be seen that it is not the steel which indicates failure in many cases.

Indeed, it is quite true in this class of work that failure is very frequently due to wrong treatment of the steel. On the other hand, there is something to be said of steel which is too easily depreciated in the process. Steel should stand a certain amount of irregularity in treatment, and it should bend to a "corrective" retreatment to a fair extent. If steel is overheated it should be reannealed, and in the reannealing process it should be possible to restore the structure, as a rule.

With a view to showing the extent to which annealing will render the structure close and of a uniform texture, the photomicrograph H-3 is given. But if the steel is annealed, in the absence of the tempering process the structure will look as it does in H-2. On the other hand, if the steel is tempered and not annealed it will take on the structure as seen in H-3a, if the normal steel looks as it does in the view H-1. All the photomicrographs as above given are of chrome nickel steel of the grade BND in the table of the products as given.



Of the BND products, H-1 was magnified to 580 diameters and the remaining products of the same brand were magnified to 350 diameters. The photomicrographs are somewhat better than the average, due in a large measure to the fine quality of the steel. The steel is used for gears of the highest grade, in which the faces of the gears can be as low as 3-4 inch, considering a 30-horsepower transmission gear set, and the low-speed pinion, six pitch, 14 teeth.

In the same fashion it is possible to know the appearance of all the grades of steel and to know as well the condition in which the material resides. It is necessary to know this in order to fix upon the treatment to give the steel in any given case. Indeed, it is not always possible to procure material from the mill and assume that it is in the "normal" state. Then there is the question of what constitutes normal steel. Some mills send the steel out as rolled, more anneal, but the annealing temperature is not always the same, nor is it true that the product is always rolled to the same limiting temperatures.

By way of indicating the extent to which steel changes in structure, as a result of changes in composition, the photomicrographs as follows are offered: 18-E is a chome vanadium steel,

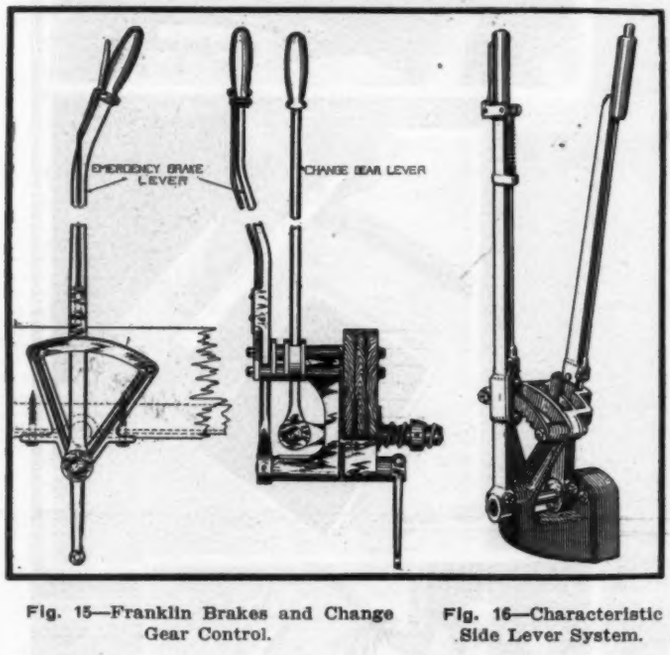


Fig. 15—Franklin Brakes and Change Gear Control.

Fig. 16—Characteristic Side Lever System.

with 16 points of carbon, low in vanadium and chromium, made by the basic open-hearth process, magnified to 350 diameters, after deeply etching and vertical illumination. The steel is in the normal state, and, with a view to showing the result of cementing, the core of a cemented section is given in 20-E, after quenching 850 degrees centigrade.

Just to show the contrast, it will be possible to give a photomicrograph, BO-1, of a specimen of 25 carbon basic open-hearth steel, the same in the annealed state. This steel is magnified to 250 diameters and was annealed from 800 degrees centigrade. It is of no value in gear work of any sort, such as should go into automobiles, and a comparison with some of the other products is enough to indicate the fact.

Importance of Straight-Line Levers and Linkages.

With suitable materials at hand the next question is to contend against all eccentric features of design, not only in the levers and in the linkages, but throughout the transmission system. It is quite out of the question to expect even fair results if all the lever rods are with crooks in them; the quality cars of the present time are noted for clean straight designs, and history, as it relates to cars which failed to come up to the best requirements, records the fact that no attention was paid to this important matter. A strut or a strain member will do its best work if the same is straight, in the plane of the strains and free from all diagonal tendencies. That it is possible to avoid interferences is proven by the large number of cars on the market in which every lever, rod, and relating member is straight and true, barring the crankshaft in the motor, which, of course, has to be capable of performing the reciprocating functions.

A curve in a lever marks the point at which the load will concentrate, hence the point at which deformation will be first noticed. Economy in the use of metal, for a given factor of safety, demands that the designs be straight-line; this is even more important than the question of the metal, for the reason that the modulus of elasticity is no higher in good than it is in inferior steel, as a rule. If parts are not straight, it is then that torsional strains will have to be handled, and under these conditions the question of the modulus of elasticity has to be taken into account to a serious extent.

If torsion and bending moments are present—and they will be in many cases—if straight-line designing is not practiced, the need for good steel is due to the bending moments, and the quantity required will be increased in view of the combined moments. The argument is vastly in favor of straight-line designing, even at the expense of redesigning a car just to realize the safety which such designs carry in them as inherent properties. The fact that torsional work brings into play the question of the modulus of elasticity as a requisite in the process of design, and the further fact that the modulus is not higher in superior steel, is no good excuse for using the inferior steel, on the ground that the dynamic life of the steel is the factor to emphasize, and this life is not pronounced in the steel of inferior quality.

Noise Is Due to Vibrations and Loose Fits.

Distinguishing between a sound that does not grate upon the ear and what is called noise, is to point out that noise is due to more than the fact that lost motion may be present. If gears do not run on the pitch line, or, if they are not cut accurately, noise will be due to these facts. On the other hand, if the same gears are shaped like a bell, they will accentuate all noise tendencies to a marked degree, and to avoid the noise, it is necessary to keep away from the bell-like shape. That gears will "squeal," if the pitch-line velocity is high, is well known, and while some cars are designed with the pitch-line velocity of the gears in the transmission as high as 1,600 feet per minute, the fact remains that 1,000 feet per minute is the maximum for that performance which is classed as noiseless.

Noise is also due to the fact that the gearcase is thin in many cases. If a noiseless performance is desired, it is necessary to use enough metal to assure a slow rate of vibration, and on this account it is a matter of small moment; the fact remaining that aluminum is stronger when cast thin, than when the walls are thick. The fact that aluminum is light renders its use in quantity sufficient desirable and by taking advantage of this idea it is possible to abort the noise due to a high rate of vibration in the gearcase, and for that matter, in the motor case as well.

Plain bearings always did have the property requisite for noiseless performance, and when ball and roller bearings came into vogue it was directly ascertained that some noise crept in. In recent times, the use of "silent" types of ball bearings reduced this tendency to a marked degree, and since roller bearings are spaced, they are not offenders to any great extent. Under the circumstances it is a fact that the bearings should not be a source of noise, and they certainly are to be preferred to plain bearings for the reasons as follows:

(a) They are more easily lubricated.

(b) They will not so quickly get into trouble if the lubrication fails.

(c) Less energy is absorbed in the bearings, hence the mechanical efficiency is increased.

(d) The weight of the system is decreased in view of the fact that the housings do not have to be so long.

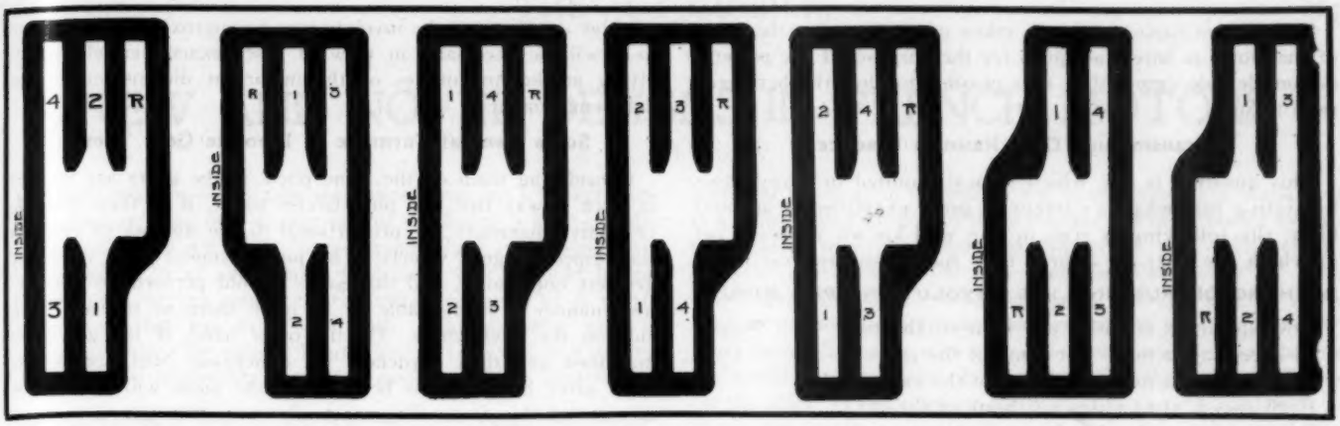


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7.

Types of Four-Speed Selectors as Used on Prominent American Automobiles, Showing Wide Variation.

(Fig. 1) Lozier Model G; (Fig. 2) Peerless and Stearns; (Fig. 3) Studebaker; (Fig. 4) Lozier Model H; (Fig. 5) Matheson; (Fig. 6) Toledo; (Fig. 7) Simplex.

(e) Alignment is of less importance if ball or roller bearings are used, although this is no recommendation in favor of disregarding the correct alignment of the bearings.

Some Features of Selective Types of Gearsets.

Selective types of gears have the advantage of the progressive plan in one particular, in that the gears do not have to be arranged so that they will "clash" in both directions. As a result the effective face of the selective gears is more, since the face must be reduced enough to bring about easy engagement (through the good office of a wedge-shaped contour) which must be on both engaging faces in the progressive gears.

In other respects selective types of gears differ to some extent, as, for illustration, the skill of the operator must be such as to enable him to determine the proper gear to slide in the train in order not to place the motor at a disadvantage. This is a feature which does not have to be considered in connection with progressive gearsets on the count that the gears are shifted progressively and the shifts correspond to the car speed.

The question of the gear ratio is the same in both types of gears for the reason that the conditions to be satisfied are the same. Just what the gear ratio should be is a matter which depends upon the several conditions as:

(a) The speed of the motor as it relates to the attainable speed of the car.

(b) The ultimate speed of the car.

(c) The rate at which acceleration is to be engendered.

(d) The design of the motor, taking into account the torque curve of the same.

(e) The degree of harmony of the several relations.

(f) The competence of tires used.

In a general way it is considered that the sliding gears (assuming three speeds ahead) should be geometrically related in the manner as follows:

MILES PER HOUR			In a four-speed transmission the third speed would be as follows:
First.	Second.	Third.	
5	10	20	15
6	12	24	18
7	14	28	21
8	16	32	24
9	18	36	27
10	20	40	30
11	22	44	33
12	24	48	36
15	30	60	45
20	40	80	60
25	50	100	75

NOTE.—With four speeds the geometrical relation of the three-speed system would be retained and the fourth speed would be interjected between the second and the third of the three-speed system, so that the third speed would become the fourth, in a four-speed system.

If the power of the motor is barely sufficient for the purpose, it is plain that the second speed should be nearer the third speed, and the practice, in general, is to favor the motor in this way. On the other hand, if the motor is of adequate power, it is then that the second speed can be in the geometrical relation, and this is an advantage on very bad roads, in that the low gear is so advantageously related as to afford adequate advantage under the most severe conditions, while the second gear will be high enough to handle quite bad roads at a fair speed in miles per hour of the car. The bevel drive can have several ratios, depending upon circumstances. The ratio is as follows:

(a) 3 to 1 in light roadster work.

(b) 3½ to 1 in light touring car work.

(c) 4 to 1 in heavy touring car work.

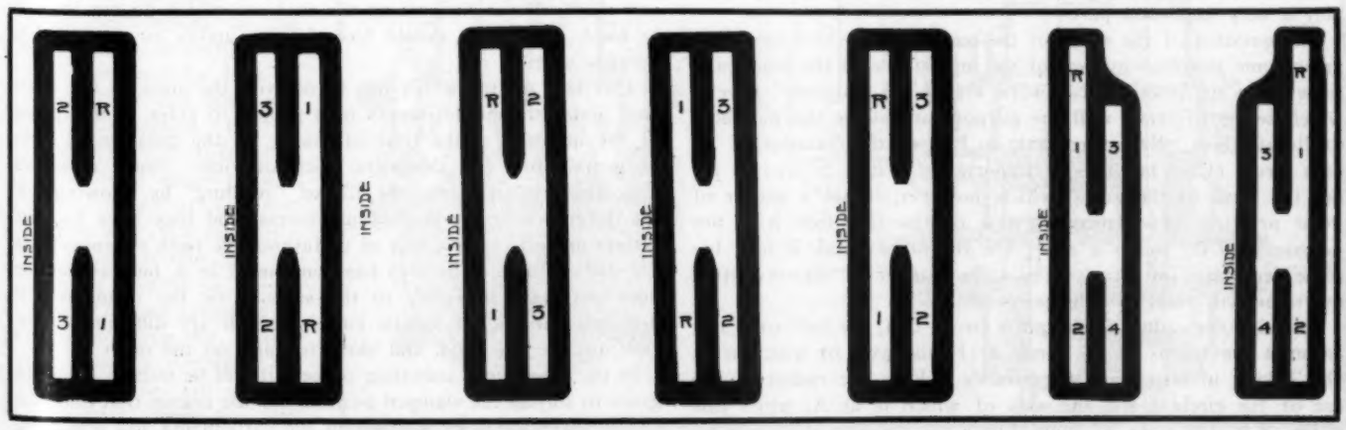


Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14.

Types of Three-Speed Selectors as Used on Prominent American Automobiles, in the Greatest Proportion.

(Fig. 8) Franklin; (Fig. 9) Columbia and Corbin; (Fig. 10) Apperson, Cadillac, Elmore, Knox, Oldsmobile, Walter, Winton and Thomas; (Fig. 11) Oldsmobile Models X and M; (Fig. 12) Buick Model 5; (Fig. 13) Locomobile; (Fig. 14) Thomas.
In publishing the cuts credit must be given to Coker F. Clarkson, of the A.L.A.M., for them.

In the given cases, account is taken of the fact that the power of the motor is barely adequate for the purpose; if the power is in considerable excess then it is possible to alter the bevel gear ratio to suit.

Transmission Gear Ratio in Practice.

This question is one which is best handled in many cases, by stating just what is current in good examples of automobiles; the following is true in one well-known make of car, in which the gear-set affords four speeds and reverse:

WITH MOTOR RUNNING 1,000 REVOLUTIONS PER MINUTE.

Low speed, 15.11 miles per hour of the car;
2d speed, 23.52 miles per hour of the car;
3d speed, 36.64 miles per hour of the car;
High speed, 51.13 miles per hour of the car;
Reverse, 9.94 miles per hour of the car.

Some Questions of Design of Sliding Gears.

Referring to Fig. 17, the cross-section indicates symmetry, in that the web is centrally located, and the thickness of the web (J) approximates that of the flange (I) so that the warping in heat treating will be within allowable limits, if the gears are "nested" properly during the carbonizing process. The thickness of the flange (I) is equal to the value of the "addenda," which is half the difference between OD and PD, in which OD = the

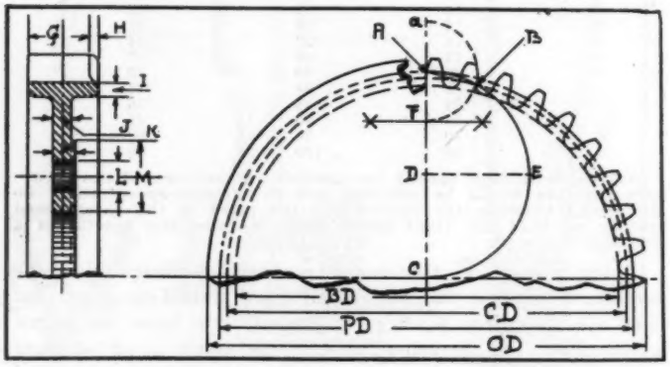


Fig. 17—Design of Square-Cut Sliding Gears.

outside diameter and PD = the pitch diameter. In the old standard machine designing, using cast iron for the most part, it was the practice to make the depth (I) equal to the whole depth of the tooth. In automobile work this depth would far exceed the allowable, for the reason that the "fly-wheel" effect of the gears would exceed the desirable value; indeed, it is the aim to keep down this effect as far as possible. On the other hand, alloy steel, or, "cemented" carbon steel, assures all the strength required under the curcumstances in which transmission gears play a very important part.

The question of the shape of the teeth is one which has to be given some attention in view of the importance of the work, and since gears in American car work are of the "involute" genera, which seems to serve well the purpose, it will be the aim here to discuss them. Referring again to Fig. 17, the diameter of the base circle (CD) becomes of importance if it is desired to lay out the teeth of the gears, which, however, is not a matter of great practical importance, in view of the fact that it is not necessary to do so, as a rule. On the other hand, it may become necessary, on occasions, and the manner of approximating the same will serve for the purpose.

Knowing the radius of the pitch circle, C A, the half of which becomes the radius of the circle D E, the axis of which is at D. Taking in turn, half the distance D E as the radius of the arc of the circle F B a, the axis of which is at A, when this radius A B will serve to approximate the addenda curvature of the teeth, provided the axis is on the base circle C D, which bisects the arc of the circle F B a, at the point B. The radius C B then is the radius of the base circle and if this system of circular arcs is used, the involute may be approximated, in so far as it will be necessary, in view of more exact methods of arriving at the magnitudes of the important dimensions, in the following manner:

Some General Formulæ of Involute Gear Teeth.

Considering teeth of the same pitch, if the gears are meshed in such a way that the pitch-circles touch, it is then that the respective diameters are proportional to the number of teeth in the respective gear wheels. The pitch-diameter then is of the greatest importance, and that gears should perform in a noiseless manner it is desirable to so mesh them as to have them ride on the pitch circle. On the other hand, if the gears are machined and then hardened, the dimensions will not be the same after hardening as before, and the mesh will have to be in view of this fact. The exact allowance to make in view of the "swelling" tendency is difficult to state, and the writer, in his work, preferred to measure the meshing gears in a machine designed for the purpose with the result that allowances as follows would seem to be in accord with the requirements:

Pinion.	Gear.	Allowance.
14 teeth.	28 teeth.	.004 inch.
18 teeth.	49 teeth.	.008 inch.

These allowances will indicate somewhat the idea, and it is a fact that the exact allowance will depend upon several conditions as:

(a) The dimensions of the gears and mates.
(b) The quality of the steel.
(c) The carbon content.
(d) The time taken in the carbonizing process.
(e) The effectiveness of the quench.
(f) Warping is a matter which has to be taken into account separately.

Deformation Due to the Heat-Treating Process.

If the gears are symmetrical in shape, and if the material is of a uniform quality, it is then that the manner of handling the product in the process (heat-treating) will have to do with the extent of deformation, more than anything else. If the gears are to be casehardened they should be nested in conjunction with soft iron blanks in such a way as to expose the teeth to the carbonizing process, in which position they should be bolted into rigid relation, with the iron blanks so fashioned as to serve as a backing to pull against. The nest so devised will then slip into the case (of cast iron) big enough to hold the nest of gears and allow for carbonizing material all around the nest of gears. When the gears, so nested, are carbonized, they may be quickly and deftly lifted out of the case and quenched in such a way as to assure that the teeth will have the benefit of the process, while the clamping will serve to abort warping to a vast extent. The gears will be hardened on the surfaces desired to be hard, and they will remain soft on the surfaces which do not have to be hard, but which should have kinetic ability to the greatest possible extent.

This is a matter which has to do with the sizes of the gears and, under the circumstances it is proper to refer to this phase of the question at the time of taking up the question of sizes of gears, from the designers point of view. Some designers have tried to overcome the ills of "swelling" by allowing for the difference in the machining process, and they have had the cutters made in such a way as to fashion the teeth to compensate for the swelling. The idea has some meat in it, but satisfaction does not seem to reside in the scheme, on the count that it demands the use of special cutters, which are difficult to procure, on the one hand, and likely to vary, on the other.

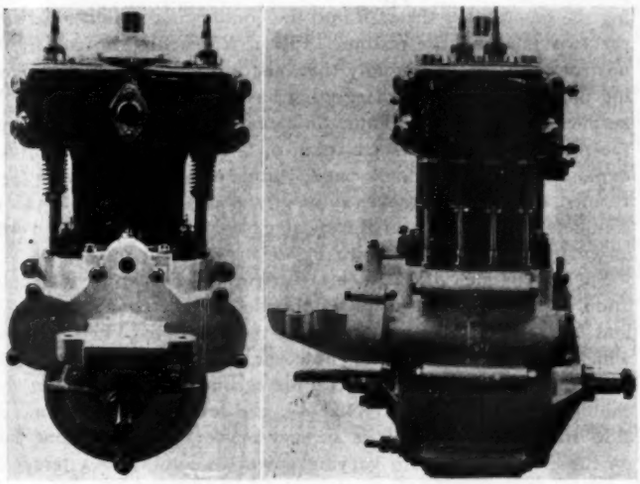
In the subsequent annealing process it will be well to allow the gears to stay in the clamped position for the reason that the same device that will abort warping in the carbonizing and quenching process will also serve in the subsequent annealing process. The object of annealing is to render the structure kinetic.

(To be continued.)

NEW AND NOVEL DESIGNS IN FRENCH MOTORS

By W. F. BRADLEY.

PARIS, Feb. 10.—The task was undertaken by a French constructor more than a year ago of producing a four-cylinder engine of 2.3 by 3.9 inches bore—practically 8-10 horsepower—which should be of such small dimensions that it could be put in the place of any single or two-cylinder engine of 6 to 10-horsepower that has ever been built. The difficulty was, of course, to reduce the overall length, and to reduce it in a greater measure than is possible by a bloc casting and the abolition of the central bearing for the crankshaft.



Front and Side Views of Aries Four-Cylinder Motor.

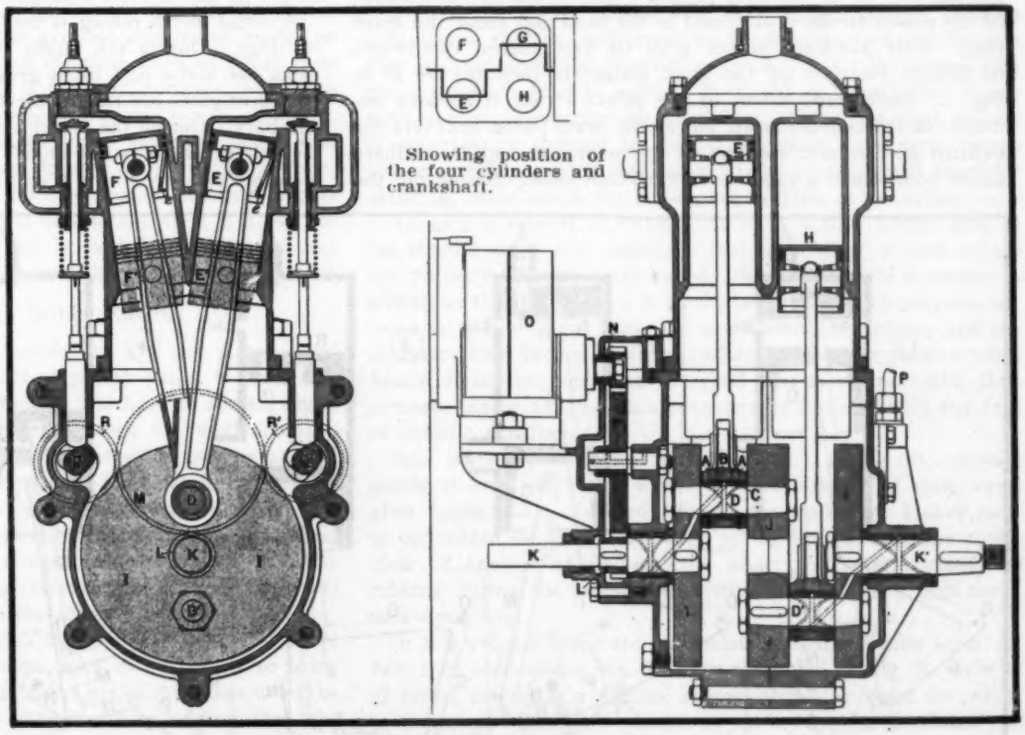
Showing magneto platform, valves and spark plugs down each side in head. The four cylinders occupy same overall length as a standard two-cylinder. The cylinders are slightly in V, thus obtaining a motor which, it is maintained, occupies no more space than a two or four-cylinder of the same power. Note vertical division of the crank case in the side view.

The engine has now been presented by the Aries Company and is certainly of such compact design that viewed from a distance it might be mistaken for a single or a two-cylinder motor. As there has been no distinct departure from the principles adopted and found satisfactory in the construction of vertical engines, the novelty may be accepted as one that will give satisfaction in the rough school of daily work.

The Aries motor consists of two pairs of cylinders slightly in V, but unlike the more familiar type of V engine the casting is in one piece. The two cylinders together forming the V have their pistons connected up to the same pin of the crankshaft; there are thus as many throws as there are sets of cylinders. In this case it is, obviously, a two-throw crankshaft that is employed, with the throws placed at 180 degrees in relation one to the other. The crankshaft is a built-up one formed of three interior flywheels united by two nickel steel connecting rods forming crank pins. The crankshaft is practically of the type made familiar in the De Dion one-lungers and other vertical engines. There is nothing really original in this, the built-up crankshaft having been employed for years on small motors, with very satisfactory results, while having the additional advantage of being very cheaply constructed. As on the single cylinder motor mentioned, the whole is carried on short stout shafts projecting through each end of the crankcase. This latter is divided vertically, being formed of two practically equal parts united by horizontal bolts, as on the majority of vertical single cylinder engines.

It has been stated that two connecting rods are attached to each of the two crankpins. In the usual type of V engine this has frequently led to complications and unsatisfactory solutions. Here one of the connecting rods (A in the illustration) has a forked end; the other (B) is of the ordinary type. A rather thick sleeve (C in the illustration) is forced onto the crankpin, and bears on it for its whole length. The connecting rod B is attached to the center of this sleeve, thus obtaining a bearing on the whole length of the crankpin. The connecting rod A, on the other hand, having a forked end, fits round the head of B, also bearing on the total length of the crankpin.

As will be seen from the illustration, two cylinders forming a pair are inclined outward, the inclination being 7 1-2 degrees from the vertical. On reaching the end of their downward stroke the two pistons forming a pair approach one another, and would come into contact were arrangements not made to prevent this. The disposition consists of cutting away a portion of one of the cylinders only, shown at *e* in the illustration. This loss of material can have no ill effect on the engine, for when under



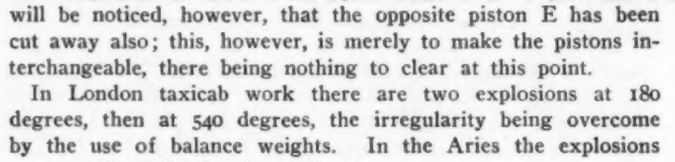
Front and Side View Cross Section of the Aries Four-Cylinder Motor.

Front View—DD, crank pins for two pistons. EEFF, pistons. I, internal flywheel. K, crankshaft. LM, timing gears. QQ, cams. RR, camshaft gears. E, cut away portion of piston.

Side View—A, connecting rod end of piston E. B, connecting rod end of piston F. C, sleeve. D, crankpin receiving two connecting rods. EH, pistons. IJI, interior flywheels. KK, crankshaft. LM, timing gears. N, magneto gearing. O, magneto. P, lubricating oil piping.

pressure it is the opposite face (F in the cut), which is bearing on the cylinder wall by reason of the thrust of the explosion. It will be noticed, however, that the opposite piston E has been cut away also; this, however, is merely to make the pistons interchangeable, there being nothing to clear at this point.

In London taxicab work there are two explosions at 180 degrees, then at 540 degrees, the irregularity being overcome by the use of balance weights. In the Aries the explosions occur at the following intervals:



Intervals Separating Four Explosions, Aries Motor.

which is obviously a considerable improvement on the two-cylinder, now recognized, however, as almost perfect in balance.

While the regularity of firing is practically equal to that of a standard four-cylinder motor, the equilibrium of the moving parts is the same, for when two cylinders ascend two others descend.

Other portions of the engine do not particularly call for attention, for the reason that they do not depart from standard lines of construction. The valves, mechanically operated, are of necessity on opposite sides of the engine.

The Korwin & Rebikoff Three-Cycle Motor.

A three-cycle motor has been produced. Like the two-cycle engine, it gives an explosion for every revolution of the crankshaft, without, however, the imperfect scavenging of the spent gases which is the principal objection now raised against this type of engine. The discharge of the exhaust, indeed, on this engine is as perfect as on a motor devoting an entire stroke for each of the four operations.

Imagine a vertical cylinder with the usual type of piston and the addition of an auxiliary piston, which, at the commencement of the power stroke is stationed in the head and above the spark plug. This auxiliary piston, with its face turned downward, or toward the face of the main piston, is indicated by *R* in Fig. 1. During two-thirds of the power stroke it remains immobile in the cylinder head, but as the main piston uncovers the exhaust port *K* near the end of the stroke, the upper auxiliary piston commences a rapid downward movement, driving out the spent gases. The descent has opened the automatic valve *b* in the cylinder head, with the result that while the piston is on the one side driving out spent gases on the other it is drawing in a fresh charge.

When the main piston has descended just below the exhaust port, the auxiliary piston is nearing the end of its stroke. The two almost meet midway in the port opening, coming so close together that practically every particle of gas is expelled through the open port. The upstroke commences, the upper auxiliary piston moving more rapidly than the lower main one. The automatic intake valve *b* naturally closes as soon as the end of the downward stroke is reached, and it is now the automatic valve *a*, placed in the secondary piston, which is drawn off its seat, allowing the gas to pass through into the combustion chamber between the two faces of the pistons. Piston *R* reaches the end of the upstroke much more rapidly than piston *Q*, which latter, following up, compresses the charge that has been admitted through the automatic inlet valve. Thus, on returning to upper dead center, the piston is ready to start again on a downward power stroke, explosion, exhaust, intake and compression having been performed during two strokes only of the piston, and that with as complete an expulsion of the spent gases as can be obtained with an engine occupying an entire stroke for the four operations.

Such is the idea of Engineers Korwin and Rebikoff. The operation of the auxiliary piston is obtained by the connecting rod *C* and levers *G G P* and *n*, shown in the diagrams. In the engine which has been constructed, however, and which has proved its worth in service, the control of the secondary piston is, for mechanical reason, made from above, the levers being on the outside of the crankcase. It is an easy matter, with an engine built on these lines, to obtain varying power by admitting a larger or greater amount of gas into the combustion chamber. All that is necessary is to arrest the upward motion of the auxiliary piston, thus allowing only a portion of the charge to pass through the piston inlet valve, the remainder being uncompressed in the head of the cylinder. This has been done on the experimental engine constructed by making provision for instantaneous change of the length of the exterior commanding levers.

A detail worth noting is that the auxiliary piston has no need of rings. During the intake the speed of the auxiliary piston being one and a half times greater than that of the main piston, the burnt gases are rapidly ejected without being able to pass the auxiliary. During the power stroke the auxiliary piston being in the cylinder head is not under any pressure, and does not communicate pressure to the levers by which it is operated.

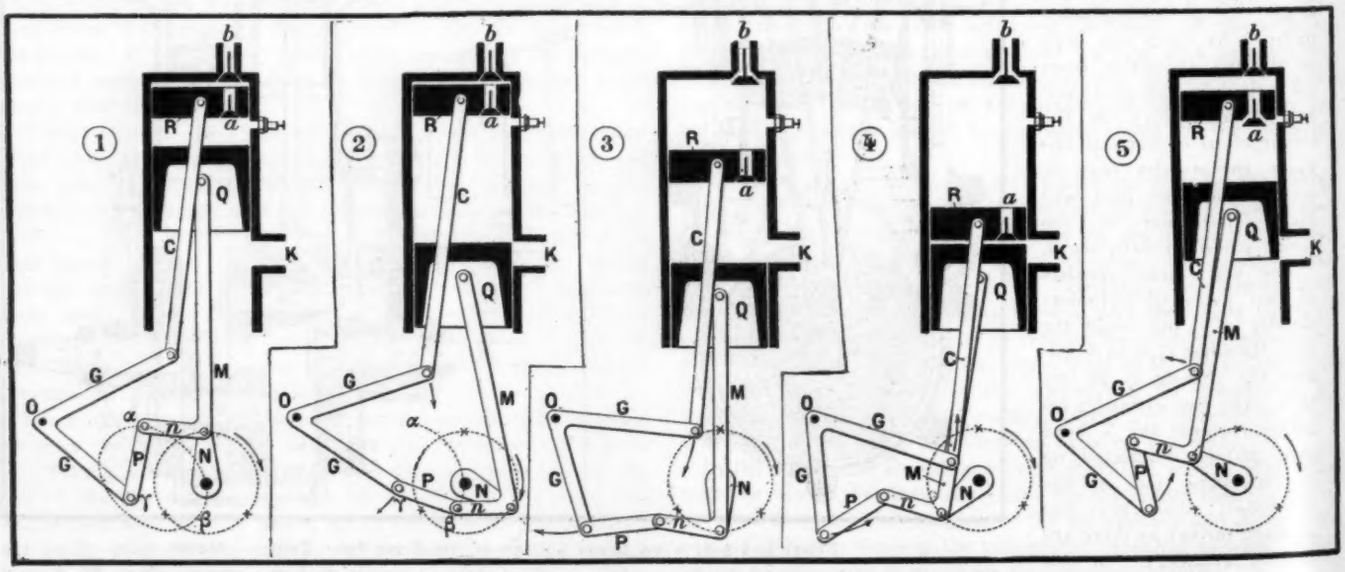


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

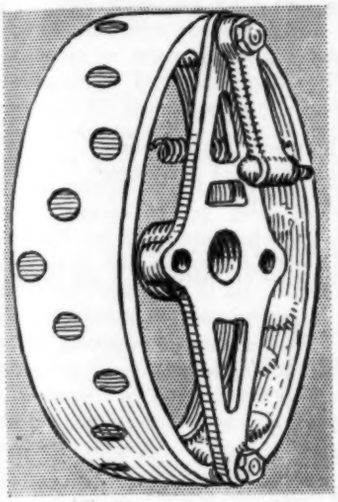
Sectional Plans Showing Operation of Korwin & Rebikoff Three-Cycle Motor.

(Fig. 1)—Commencement of power stroke. (Fig. 2)—End of power stroke. (Fig. 3)—Middle of second cycle, auxiliary piston commences its downward stroke, and aspires through automatic valve "b." (Fig. 4)—End of the second cycle; spent charge has been expelled and intake is completed. (Fig. 5)—Middle of third cycle; compression, the gas passing through automatic valve "a" into combustion chamber.

MODERN TREND OF DESIGN IN MOTOR BRAKES

By LAWRENCE WHITCOMB and THOS. J. FAY, Members Society of Automobile Engineers.

UNDER ordinary circumstances it is well understood that in the braking operation, taking into account the instantaneous value of the initial effort as measured in negative torque values, foots up so high as to engender what would be easily termed excessive torsional values in a shaft, the ability of which would be adequate from the point of view of the "normal" positive (mean) torque of the motor. In view of the fact that it is possible to so design brakes as to defeat this excess initial effort, provided the machine members are equal to the occasion, as measured in terms of the work put upon the members by the clutch, it is possible to regard the ability of a suitable clutch as the measure of the ability of the brakes, and in some measure, at any rate, the plan here will be to discuss the brakes along such lines. The other side of the question takes into account the question of the disposal of heat, at such a rate as to enable the brakes to work for a time so long that the increase in heat (in the absence of some means of disposing of the same) would defeat the project. In the meantime it is assured that no set of brakes would be able to accomplish the task within the limits as measured by the ability of the clutch, in the absence of design features taking into account the amount of energy which can be dissipated while the car is at high speed; which is when the greatest amount of work can be done in the shortest time, hence the time when an effort must be made to absorb the energy; it is the time, however, when it is necessary to guard against excesses by way of "fierce" action.



Cork Inserts in Brake-Shoe.

It is not always the materials of which shoes are made that counts for utility. If the shoes do not cling to the surfaces they will be of no great value, no matter what the quality may be, and if the mechanical means is defective, then it is a fair inference that the performance will be bad in spite of the use of "cork inserts" or whatever the surfaces of the shoes may be.

Product of the Initial Effort.

If the operator presses with a force of, say, 100 pounds, and the lever advantage is on a basis of ten to one it is plain that the members at the end of the linkage will have to sustain under 1,000 pounds. It is not uncommon to see the mechanism so poorly devised as to "give" when the pressure is thus applied and multiplied, and it is no stretch of the imagination to conclude that the multiplication of pressure as theoretically deduced is a long way from the truth. On the other hand, it is unfortunately a fact that the pressure, if it produces a distortion, will have the effect of producing variations in pressure that will end in excessive surface contact at points in the shoes.

The surfaces thus compelled to take more than a fair share of the pressure will wear the most, and so quickly as to bring about acute brake trouble. When brakes are at this stage it will be the natural thing to "adjust" them to new contact, but the original trouble will still be present and the uneven pressure will again wear away the spot of contact, quickly, as before. Such brakes will be called of no great value, and the materials will be condemned as of no use for the purpose when, as a matter of fact, it is the weakling structure that is at the bottom of the whole trouble.

Internal shoes, unless they are of good section and enough strength to maintain their shape, will surely deform just enough to bring about the uneven surface pressure as before outlined, while "band" types must either be very supple so that they will evenly hug the surfaces or they must be rigid in the extreme, in which event it is important to apply the pressure in such a way as to make the axis of pressure the axis of rotation of the drum. This is rarely the case, and with rigid bands it is to court two classes of trouble, at least. In the first place, the bearing pressures will be so lopsided as to cause the bearings to degenerate. Did anyone ever take into account the fact that a pressure which wears out a good bearing will play havoc with a brakeshoe for the same reason?

Influences That Demand Time in Stopping a Car.

If a car is traveling at a low rate of speed, say, 20 miles per hour, the time factor is not a serious matter for then the tire contact is unaffected by the rate of speed to an extent such as will need be taken into account. On the other hand, it is not when cars are going at this low rate of speed that brakes are of the greatest importance and even poorly constructed brakes might be made to serve the purpose.

But when a car is going very fast it is then that the brakes begin to show their qualities, if the brakes are really in possession of qualities to any great extent. As a car speeds up the ground contact of the road wheels becomes more uncertain and the brakes are more prone to fail. The curve given shows that the coefficient of friction falls away quite rapidly as the speed is increased, and the result is that the brakes work at a great disadvantage under conditions of high speed.

It is at the higher speeds, just when brakes become valuable possessions, that the indifferent kind fail in service, not because they will not apply the requisite pressure, but for the reason that the pressure is bruskly applied, if it will be permissible to use such a term to express the condition. When the road contact is uncertain or reduced to quite a low point it is easy enough to see that any sudden application of the pressure will engender skidding, after which the brakes are of little or no value.

At such a time it is essential to have a time factor, and as the shoes contact it is necessary that they "give" a little before the pressure becomes pronounced. Were rubber of a nature to withstand the temperature it would be good for the purpose, because it would "give" with the application of pressure and the necessary time factor would be realized. Once the shoes contact firmly, if in the meantime the road wheels do not skid, then pressure can be added with a considerable force without any fear of causing skidding.

Any material, then, which will allow the shoes to contact gently at first and firmly within a short distance of shoe travel after contact is established will do the work that brakes have to do, within the limits of ability, taking into account the coefficient of friction of the material under the several speeds of rubbing during the process of slowing a car from a high speed to a dead stop.

In this process there are two prime conditions aside from the fact that establishing the working condition during the interim of initial contact is a delicate process that may upset the whole performance. The two condtions are: (a) the coefficient of friction at high rubbing velocity, and (b) the coefficient of friction at low rubbing velocities. They are not the same and the result is that no single set of materials will give all the results desired. But this alone is not of great importance provided the material used will engage well and serve at the higher speeds.

* Paper read at the December, 1908, meeting of the Society of Automobile Engineers, held in New York City.

Metal to metal will not do this, even approximately. The result is skidding will ensue with metal to metal. If skidding does not ensue it will be on account of bad initial contact and the materials will abrade in the process which spells short life of the shoes. This is due to the fact that the materials chatter and in some measure serve to prolong the time of making the contact. During this interval the metals are scored, and later as the contact is more firmly made, the loosened metal is detached.

The material that will engage softly and slow the car down to a point where metal to metal contact is a practical possibility is the material that will abort skidding and protect the metals from undue wear. Cork alone will not serve the purpose any more than will any other soft material. What is wanted is the cork to a limited extent only, and this to be followed by metal-to-metal contact *as a final operation.*

Conditions Favorable to Cork.

Under such conditions the cork will do the engaging and abort skidding while, as the pressure is increased, the cork will press more and more until it recedes into its sockets, when, the speed will have fallen off and metal-to-metal contact will take hold under conditions that will measure success. But it will only be so if a car is arrested from a high speed. From ordinary speeds the cork alone will do all the work and the brakes will act softly and with certainty. This is due to the fact that the effort required to stop a car from a low speed is little in comparison with the effort at a high speed, and it is only under high-speed conditions that brakes so designed will be tested to the metal-to-metal limit.

In nearly every treatise on the subject the situation is handled on a basis of a constant coefficient of friction which is far from the true state of affairs. It follows that brakes do not serve well under certain conditions, even though they might do very well, indeed, under demonstrating conditions in the park at a speed of from 20 to 30 miles per hour with good roads. What to take into account is the moment of friction, as it obtains at all speeds, and try, by some means, to arrive at a constant or nearly constant moment of friction for a constant moment of pressure. This is not quite possible because there is no material that will quite fill the bill, but cork in the insert form comes very near to a complete performance.

When a car is going fast it naturally covers the maximum distance in a given time. It is at such a time that the effectiveness of the brakes will be (a) not worth taking into account if the materials used for the facing will not take hold; (b) the car will be brought to a stop in a short distance if the materials will act during the time the drum is rotating at a high speed.

Under these conditions everything depends upon the ability of the materials during the time the brake drum velocity is high. If materials of a high coefficient will engage at a high speed, then it is plain that just when the car is covering the most ground it will be arrested in its flight to the greatest extent. This is the time when the mass has stored in it the greatest amount of energy, but it is also the time when the energy will be absorbed at the highest rate if it is true that the brakes can be made to work efficiently. This is also the time when the shoes will be damaged if the engagement is not smooth. It will be smooth if a compressible material is used in conjunction with a final metal-to-metal contact.

Clutches and Brakes Compared.

The very clutch, on which so much time is spent, is the exact device that will serve perfectly for brakes. The earnest attempts made to give life to clutches are wanted in connection with brakes. The reasoning for the one is good for the other, and any reasoning that is a fallacy for clutches is a fallacy for brakes. The argument in favor of brakes on the rear wheels to avoid shock to the transmisison is weak, unless it is an admission that the same transmission is damaged by the clutch. If the clutch will hold while the motor slips the wheels, the brakes can do no more. If the brakes would unduly shock the transmission system, so would the clutch. The car that will not stand up with brakes on the propeller shaft will go to rack equally fast, because the clutch will furnish the very same destructive effect complained of in connection with the brakes.

The clutch is operated with great frequency, whereas the brakes are used to stop a car, or to frequently slow down, if the driver is more or less incompetent. At all events, it is the clutch, as a rule, that will do the most damage to a weak car, not forgetting that the motor is the prime source of the power. With a view to showing what it means to have the brakes on the traction wheels instead of upon the propeller shaft, or some other shaft back of the clutch, rotating at a speed higher than the traction wheels, a concrete example may be set down as follows:

Assume a 12-inch brake drum under two sets of conditions as follows: 1. On the propeller shaft making four times as many revolutions per minute as the rear wheels; 2, on the rear wheels at one-fourth the speed of that of the propeller shaft.

Pull in pounds on the periphery of the drum in a given case will be equal to:

$$P = \frac{H.P. \times 33{,}000 \times Q}{2\pi R S}$$

When

P = pull in pounds on the periphery of the drum;
$H.P.$ = the actual delivered horsepower of the motor;
Q = the efficiency of the transmission;
R = radius of the drum in feet;
S = angular velocity in revolutions per minute.

For a case involving a 25-horsepower motor at 1,500 revolutions per minute we have:

Case One.

$$P = \frac{25 \times 33{,}000 \times .70}{6.28 \times .5 \times 1{,}500} = 122+$$

Case Two.

$$P = \frac{12.5 \times 33{,}000 \times .70}{6.28 \times .5 \times 375} \times 2 = 490$$

In other words, a brake system on the higher speed shaft will balance the ability of the motor under the conditions named, if a pull is exerted equal to about 122 pounds on a drum 12 inches in diameter. If the two drums are used on the rear wheels, assuming an equal division of work, the pull on the main rod will have to be four times the pull for case one, because the speed is one fourth and all the remaining conditions are equal in both cases. Back of the compensating device the effort will be divided by two, and the pull on the respective traction wheel drums will then be 244 pounds approximately, for the case in hand. If the pull on the periphery of the high-speed brake drum is all that can be afforded, then it is plain that the greater pull required on the traction wheel drums will not be available. If the pull required for the lower speed—traction wheel—drums can be allowed, the problem resolves itself into the question of the relative virtues of speed versus pull.

Relative Virtues of Speed and Power.

The effectiveness would be proportional to pressure on the periphery, on the one hand, and to speed upon the other were the coefficient of friction to remain constant for all speeds of slipping, and for all materials, which is not the case. On the other hand, the higher the speed the quicker the action for any material that will prove efficient as the speed increases. In these points we have the reasons for success in some cases and failures in others.

Designers who do succeed consider the abilities of the materials they use, under the conditions of use. Some fail through imitating designs that work, as respects materials, but not under the same conditions, as respects pressure and speed of rubbing.

The abstract coefficient of friction as determined in a laboratory is as far from the true facts, in practice, as it is possible to go. If the materials are pulled over the face of a platen at a low speed, under a given load, for a given area of bearing, the respective materials will perform in proportion to their respec-

tive abilities to cling to the platen surface. The coefficient so obtained affords no clew as to the effect of speed, although it is possible to plot a curve for pressure by the simple expedient of changing the weight for a given area. These coefficients are good, as far as they go, but they do not go far enough to serve the purpose sought, with the result that brakes work, or they do not, merely depending upon the speed of rubbing when pressure is applied for any given material. It makes no difference what the material is, since there is no single genera of material of which we have knowledge that will work under conditions of a constant coefficient of friction, under all conditions of speed.

Composite Shoes Required.

The conditions in practice require the use of two classes of material in the shoes, as follows:

A, A material that will "bite" upon contact at high rubbing velocities; B, a material that will supplant the high-speed clinging material when the speed falls off, and pressure must be increased to continue the effort to a successful climax.

Some six or seven years ago, when cork was at first considered seriously for clutches, Mr. Fay, then executive engineer for the C. W. Hunt Company, decided that cork—if it was good for the purpose—might be used exclusively and instead of an insert, made shoes of pressed cork and tried them out under very exacting conditions of service. The experiment was an indifferent success for the good reason that unsupported cork "crawled" out from under the pressure. It took time to unravel the mystery, and it was ultimately ascertained that too much cork was worse than none at all. Brakes must have shoes that stand up to the pressure, because the mechanism is so closely linked that an excessive increase in the length of the band results in exhausting the travel of the linkage. If a drum, say, 12 inches in diameter, is lined with a material that compresses 1-16 inch the condition will be as follows:

$$3.1416 \times 12 = 37.6992 \text{ inches cir.}$$
$$3.1416 \times 11\ 7\text{-}8 = 37.3065 \text{ or } .3927 \text{ inch difference.}$$

This increase if .392 inches in the length of the band, is more than the take-up will allow in addition to the normal clearance, and the band will then not constrict adequately for the purpose. Increasing diameters of drums increases the trouble, since the length of the band is equal to:

$$2\pi R = \pi D,$$

when R and D = radius and diameter, respectively.

It is easy to see why all cork failed in service. It fell away from the pressure and the take-up reached the limits of available effective sweep. Beyond this point lies an unbroken series of reasons why the cork should be used as an insert, viz.:

A, the cork is not a good conductor of heat, and if it is inserted in metal, the heat will be spread out over the metal surfaces and be radiated from the cork as a result. The cork then will get no hotter than the metal.

B, the cork will grab at a high speed and will snub motion—relative—up to the limit of its ability.

C, when the pressure conquers the rigidity of cork, the inserts will compress in their sockets, without loss of ability up to its limit, since it will contact just the same—not unlike a compressed spring—and present about the same face area as before it is "flushed";

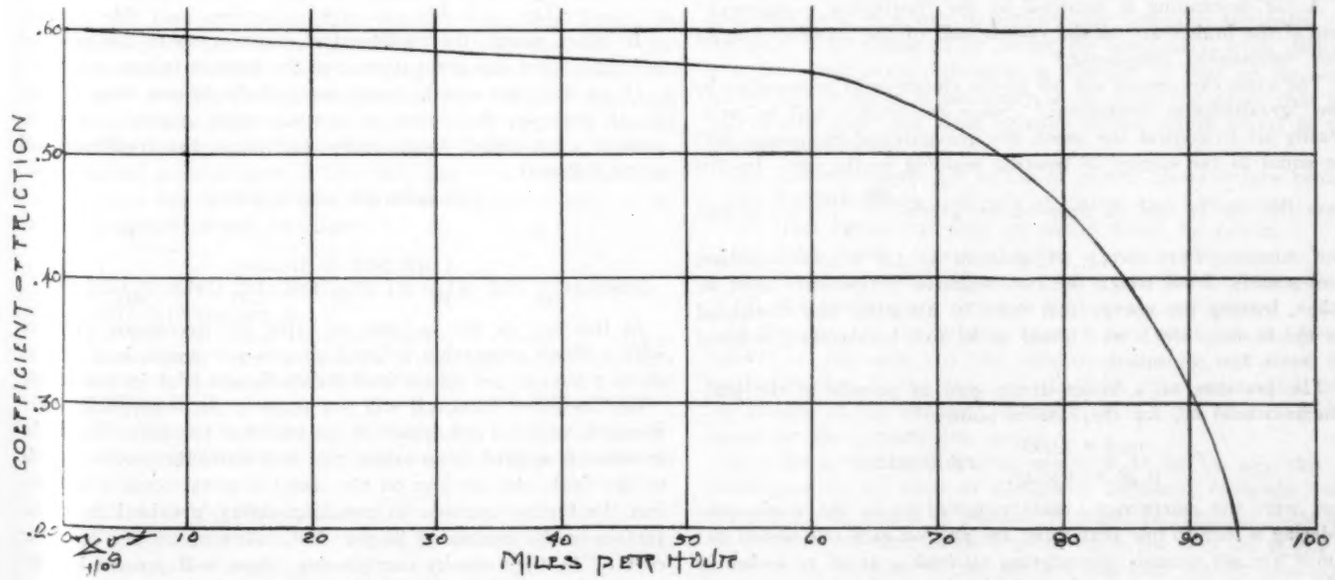
D, when the metal faces contact they do so under high pressure and lowered speed, hence under effective conditions for metal, and it will then grab on as well and render assistance to the receding corks. In these phenomena, we see the reasons why a dual condition of the brake shoe media will best serve the ends to be sought.

Wipe the Heat from the Surfaces.

In motors, to keep them cool, we arrange to wipe the heat off of the hot surfaces, and we use a liquid for the purpose, as water, or glycerine and water, etc. The specific heat of the liquid is brought into play and by keeping the liquid churned, or circulating, we bring cool splashes of the liquid up to replace the heat-laden portions fast enough to absorb all the heat and maintain a constant temperature. If we can wipe the heat off of the hot surfaces of the motor cylinder head, we can duplicate the process in connection with the brakes. We did not think it so easy without resorting to waterjackets, and most of us refuse to add to the freezing zones. Oil did not seem to lend itself to the process, since in the past the problem was to keep oil away from brakeshoe surfaces, but clutches submerged in oil do work. So will brakes. They will work in conjunction with cork inserts on a moderate pressure, or they will work anyway if the pressure is high enough to drive the oil out from between the faces and let the metals contact. It is best to avoid these high pressures if we can, and if cork is the product that will wipe the oil off of the faces—just as a rubber mop wipes water off of plate glass—and allow of friction contact, cork has a property that lends itself nobly to the task to be performed.

Coefficient of Friction of Cork.

The coefficient of friction of cork on oiled faces is higher than that of leather, as it is ordinarily found in cone clutches. It is high enough then to assure working qualities under pressure and low enough to abort structural impossibilities. The oil bath will serve to wipe away the heat and distribute it over the radiating surfaces of the housing. The one remaining factor is



Curve Showing How the Coefficient of Friction Changes, on a Given Road, as Speed Increases.

that of providing enough surface to dispel the heat. The emissivity of roughened black surfaces, as iron housings, for oil baths, with the car in motion, as will be the case with brakes on cars, may be set down as at the rate of 10 watts per square inch, within the allowable increase in temperature for the materials used. The surface then to radiate the heat must be sufficient to dissipate energy at a rate equal to snubbing a car on a grade, for some time, and taking the electrical equivalent of a horsepower, a means is at once afforded for fixing upon the requisite surface.

A Simple Concrete Application.

The simple process of stopping a car does not involve this problem, since the body of oil in the bath would have to be heated and that would have to be at the expense of time. In descending a grade the speed of a car would probably be low—say, ten miles per hour—and with the clutch free, thus putting it up to the brakes. Assuming that the friction of the car would total 30 per cent., weight would enter into the problem.

10 miles per hour = 880 feet per minute;
880/5 = 176 feet fall per minute;
= vertical drop per minute;
car weighs, say, 3,000 pounds, and a gradient of one in five;
3,000 × 176 = 528,000 foot pounds;

from which take 30 × 880 = 26,400; leaves 501,600 foot-pounds;

hence, $$\frac{501{,}600}{33{,}000} = 15.2\ H.P.;$$

15.2 × .70 = 10.6 *H.P.* to be dissipated in heat over the surfaces;

and $\frac{10.6 \times 746}{10} = 791$ square inches of oil bath housing-surface required to dissipate the heat on a basis of 10 watts per square inch. This is not impossible.

This is on a basis of a draw-bar pull of 20 pounds per ton mile, which is a fair average figure, although some tests made some time ago showed 70 watts per 1,000 pounds—rate of expenditure—for a 3,000 pound car, would foot up to:

70 × 3 = 210 watts;
210 × 10 = 2,100;
2,100/746 = 2.8 *H.P.*;
2.8 × 33,000 = 92,400 foot-pounds per minute.

If the car—outside of the transmission losses—will retard on a bases of 92,400 pounds per minute, when doing 10 miles per hours, instead of 26,400 foot-pounds, then the surface of the drum housing will need be less. In this we have a factor of safety which may be allowed to stand.

Retarded by "Horizontal Component."

A car descending is retarded by the "horizontal component," and if the brakes are on the remote end of the transmission, by the "mechanical component."

The same car—motor cut off by the clutch—will be impelled by the "gravitational component." Since the brakes will be arbitrarily set to control the speed, the gravitational component will be equal to the energy of position residing in the car. In this case the car is said to drop—down grade $\frac{880 \text{ feet}}{5} = 176$ feet per minute. The energy of position is 176 × 3,000 = 528,000 foot-pounds, from which the two negative components must be taken, leaving the energy that must be absorbed and dissipated by the brakes, which was found to be 10.6 horsepower, reduced to watts for convenience.

The pressure on a brake drum—pull in pounds at the periphery—would be, for the case in point:

$$P = \frac{10.6 \times 33{,}000}{6.28 \times .5 \times 45} = 246 \text{ pounds};$$

and were the emergency brakes required to do the work, considering a four to one gear ratio, the pull on each one would be: 246 × 2 = 492 seconds, considering all brakes as of 12 inches in diameter. In the cases involving brake-drums of greater diameter, examples of which are now quite common, the situation becomes much more favorable, except that it must be remembered that the "take-up" will have to be more carefully regulated, for reasons which will be obvious.

An Emergency Condition Portrayed.

In this we see the greater need of brakes than would follow the previous condition in which the torque of the motor was taken as a guide, but a gradient of one to five is most ususual, and the double set of brakes would about correct the discrepancy, were all the brakes of equal competence. There is one other way to take care of this condition; that is, place the emergency brakes on the clutchshaft and gear down so that the clutchshaft would be rotating at a considerably higher speed than that due to a direct drive. The losses in transmission would also help out. At all events it is possible to maintain the first contention in which the 12-inch drum would have to sustain a peripheral pull of 122 pounds.

Ability Is Proportional.

But the ability is proportional to the pull on the periphery, and the life is proportional to the contact area in square inches for a given material and peripheral pull. If we allow that the projected area will equal the contact area, then for a drum of 12 inches in diameter, with shoes 2 inches wide, the projected area will be:

12 × 2 = 24 square inches.

If it is safe to work on a basis of 10 pounds per square inch,

24 × 10 = 240 pounds;

and since this pressure will be against the periphery, it will be resolved as a tangential effort and become the pull *P* in the formula

$$P = \frac{H.P. \times 33{,}000}{2\pi R S} = \text{pull in pounds};$$

when, *R* and *S* = radius in feet and speed in revolutions per minute, respectively. The next question is: Will some other pressure per square inch be better? We will endeavor to answer this by some further tests.

Illustrating the Point.

If we assume that bronze on steel will be the basis from which to judge of relative values, it will be necessary to fix upon the coefficient of friction of the basic products first. This, for several pressures at low speeds, will be as follows:

Pounds per square inch:				
2	4	6	8	10
Coefficient of friction:				
.14	.14	.14	.14	.14

In other words, the coefficient is constant up to the point of seizing. After this point is reached the friction follows no law.

If, on the other hand, 20 per cent. of the bronze shoe surface is of cork—in the shape of inserts—using 3-4-inch corks in sockets 1 1-2 inches apart, center to center, the coefficient will be as follows:

Pounds per square inch:				
2	4	6	8	10
Coefficient of friction:				
.35	.35	.35	.327	.293

In this we see the increase in value for decreasing pressure with a direct proportion below 6 pounds per square inch, and at about 5 pounds per square inch the coefficient is at its maximum.

On the other hand, oil will not squeeze out—excepting under the cork, where it is mopped off—at such low pressures, and if the pressure is applied to an extent that will cause the cork to recede to the flush, the oil film on the metal-to-metal contact will defeat the further increase in clutching ability, provided the metal surface is the remaining 80 per cent., allowing 20 per cent. for cork. The theoretically correct shoe, then, will present but little metal-to-metal surface and an easy oil channel.

LETTERS INTERESTING AND INSTRUCTIVE

DOUBLE TAXATION, STATE AND CITY.

Editor THE AUTOMOBILE:

[1,750.]—Will you be kind enough to advise me on the above subject, as follows: If, in addition to the tax paid by all automobile owners in their own State for license to use their machine on public highway, the town in which a man lives assesses his automobile as part of his personal property, similar to that of his home (and horses, etc.), is this not a case of double taxation; and is there not a reason to protest against it? No road tax is assessed on horse and wagon. J. F. B.

New York City.

You are not subjected to double taxation, for the following reasons:

First: The registration fee for your automobile which you pay to the Secretary of State is not a tax on property, but a license fee imposed to defray the expenses of the motor vehicle department in registering machines, issuing licenses and doing such other things as are required by law.

Second: Since the registration fee is not a tax on your automobile as property based upon value, it necessarily follows that, for the State as a municipality, to levy a tax on your automobile as property, is not taxing you twice for the same thing and in the same manner, or subjecting you to double taxation.

Third: Fees paid for registering an automobile, provided the fees are reasonable and are in amount no more than necessary to defray the expense of issuing the license and registering the machine, also maintaining the motor vehicle department, are properly imposed under the police powers of the State. By requiring the registration of machines, an identification system is established, for the detection of offenders against the law and the safety of the public.

Fourth: If the registration fees are unreasonable in amount, the excess is a tax upon either the automobile as property or the privilege of using it, in both of which cases the tax is illegal.

Fifth: Provided the registration fees are unreasonable, it is not double taxation for a municipality to assess a tax against an automobile upon which the unreasonable registration fee has been paid, because double taxation presupposes an existing legal tax.

These questions are now being litigated in New Jersey in a case testing the automobile law of that State. A decision is expected soon from the Supreme Court which will be of vast importance. It is claimed that the annual registration fees for automobiles in New Jersey are excessive and consequently illegal.

The fees required by the State of Connecticut for registering automobiles are not so high as required in the State of New Jersey, still they are larger than demanded in New York. In the latter State the fee is $2, and it need be paid but once. Whether the Connecticut fees are illegal because excessive, depends upon whether there is a material surplus left after deducting the motor vehicle department's expenses. It is merely a case of subtracting the expenses from the income. If there is a substantial balance, it is revenue, it is a tax, and it is illegal, because, since it is a tax, it is not imposed according to valuaton as required by constitutional provision.

OXYGEN AND NITROGEN IN AIR BY VOLUME.

Editor THE AUTOMOBILE:

[1,751.]—Will you please state the relation of nitrogen to oxygen in atmospheric air, under a pressure of one atmosphere, and at a temperature of 60 degrees Fahrenheit?

Jersey City, N. J. ALEXANDER.

(*a*) To find the quantity of nitrogen, by volume, in atmospheric air, corresponding to one volume of oxygen, proceed as follows:

$$N = O \times 3.770992 \quad (1)$$

(*b*) To find the quantity of oxygen, by volume, corresponding to one volume of nitrogen, proceed as follows:

$$O = N \times 0.265182 \quad (2)$$

Volume changes with temperature; which must be considered.

QUITE AN UNDERTAKING, TO BE SURE.

Editor THE AUTOMOBILE:

[1,752.]—I am a subscriber to "The Automobile" and so I refer to you to answer the following questions:

I am making an induction coil and want to use 40 No. 16 double cotton-covered magneto wire for the secondary winding. I would like to know if you could tell me what size wire I could use for the primary winding, and what voltage to use for the best results. Could you give me any idea what diameter the flanges should be and what diameter core I should have. The coil will be 16 inches long.

San Rafael, Cal. F. W. ORPIN.

There is very little that you say which would enable one to aid you on a basis of much safety from the point of view of result of a character such as would take rank with good coils to be had on the open market. The leakage factor will be enormous if the core is as long as you suggest, and the diameter of the core should bear some relation to the length to compensate in some measure for the great length. On the other hand, if the diameter of the core is great, it is then that the length of the mean turn will be overmuch and the number of turns for a given resistance will be relatively few. No flange at all would suit the case, it is believed, for then it would be right to taper off the windings as they approach the ends of the core. The end windings probably will do but little good, anyway, and tapering down at the ends will enable the winder to accomplish the task with greater ease, unless it is that the winding is done on a machine. Probably the primary wire should be about 16 to 18 B. W. G. and the secondary winding should be between 36 and 38 B. W. G. for the secondary if the coil is to be used in automobile ignition work. On the other hand, it would be well to reduce the length of the core if the coil is to be used for automobile ignition service. As to the core, it is possible that one inch in diameter would do.

GEARS HAVE TO BE MESHED PROPERLY.

Editor THE AUTOMOBILE:

[1,753.]—Will you please tell me through "Letters Interesting and Instructive" how to time the half time gears properly on a double-opposed motor when the large wheel is in the lower part of the crankcase under the crankshaft? Also tell me if an engine will run at all if the gears are not properly meshed. How can I overcome the grinding or churning noise made by the water pump on this engine? Will grease do it? If so, what kind?

South Braintree, Mass. SUBSCRIBER.

The location of the half-time gear is merely incidental. The timing must be in accord with the fact that the valves must open and close in a way to perform the functions efficiently. If the gear is so placed as to render the mechanical work difficult it is then that more skill must be brought to bear on the task. In the meantime it is necessary to so mesh the gears that the valves will open and close relative to the piston travel in the manner as follows:

(a) Exhaust opens 3-8 inches of piston travel before center.
(b) Exhaust closes 1-16 inch of piston travel by center.
(c) Inlet opens 1-16 inch of piston travel by center.
(d) Inlet closes 1-4 inch of piston travel by center.
(e) Maximum spark advance, 33 degrees before center.
(f) Maximum spark retard, 7 degrees beyond center.

In the case (a) the exhaust opens before center on the power stroke; in the case (b) the exhaust closes by center on the suction stroke; in the case (c) the inlet opens coincident with the closing of the exhaust; in the case (d) the inlet closes by center on the compression stroke.

In relation to the timing as given, it is fair to say that in actual practice all sorts of deviations are made from the relations as given, and it is possible to argue in favor of them all. As a matter of fact, much depends upon the area of valves as it relates to the area of the cylinders and each specific case must be given attention on a basis, taking into account the details. Then it is a fact that the speed of the motor must be considered,

and since speed and compression must be taken into account simultaneously, it is evident that the problem can be multi-sided.

In a general way the timing as above set down will afford good results. The best way, perhaps, to mesh the gears for the right cam position is to shift the camshaft gear as it relates to its mate. The mechanical construction will have to be considered in this connection. A length of wire inserted into the priming cock of the cylinder head will serve as a depth gauge. The piston travel can be marked off with good accuracy in this way, and it is more definite than taking into account the angle of the timing as it may be marked off on the flywheel.

If the water pump grinds it is crying for grease, assuming the surfaces are not cut. The makers of grease for lubricating purposes will fill your order for the right quality upon request. If the pump is of the "gear" kind, and if the speed is high, it will make a little noise anyway.

OUTLINES OF A VERY SIMPLE CAR.

Editor THE AUTOMOBILE:

[1,754.]—As an interested reader of your journal, I would like to ask why a car outlined as below would not be a desirable car to build and own, by reason of its extreme simplicity.

First, use a three-cylinder two-cycle motor, cranks at 120 degrees, crankshaft offset, air-cooled by gear driven blower and cases around each cylinder, balance wheel at each end of crankshaft to aid in steady running; the same gear that drives the blower to drive the timer, and a force feed oiler to care for engine lubrication; all other parts oiled by local cups. Incorporate in rear flywheel a low tension magneto with coils on dash.

Second, use a friction transmission with differential on jackshaft and an enclosed silent chain running in oil both to each rear wheel; brake surfaces and sprockets integral on each rear wheel; all wheels and jackshaft, ball or roller bearings.

Third, control on left side; at least 32-inch wheels, and car of medium weight and power and speed; any type of body.

I am not an engineer and know nothing of the technical difficulties involved, but from a layman's point of view this car would have what would seem to be the simplest of all engines to build and care for and the simplest of transmissions. The engine would have the torque of a six-cylinder four-cycle engine, but all valves, springs, cams, rods, side shafts, pump, and connections, radiator and water are done away with in one stroke; also the extra moving parts for a separate magneto are saved.

I have seen it stated in the "Scientific American" (presumably unbiased) that a properly designed friction transmission was more efficient than an equally well designed sliding gear. Assuming them to be equal (I do not know that they are), with the friction transmission you eliminate from your car clutch, gearbox, sliding gears, universal joints, shaft, bevel gears, and the heavy and complicated divided rear axle, and substitute a transmission that is simple, light, cheap and fool-proof together with the strong, light, solid rear axle. Enclosed silent chain should be noiseless and should not stretch and ought to run easier than gears—at least it was my experience with many makes of bicycles that the chain-driven ones ran the easier. By reason of the steady pull of its engine and the innumerable speed combinations that friction transmission permits, this car ought to be very flexible. In view of the relatively few moving parts to make, the initial cost of the car should be low and yet enable a manufacturer to use the best of material and workmanship, its life should be long and its upkeep slight, and for the owner who must look after his own car there would seem to be the minimum of moving parts to watch in the machine outlined. It seems to me that every step taken in the direction of simplicity, so long as efficiency is not reduced, is a step in accordance with good sense and the tendency of the times.

I am an Elmore owner and a believer in the two-cycle principle, and also believe that when the two-cycle engine has reached the present perfection of the four-cycle, it will drive the latter from all but special fields. If you have your gas and spark a two-cycle engine can't help but go. Would the car I have outlined be practicable? Would it meet my expectations as to life, ease of operation, flexibility, low price, general every-day use and roadability.

Mineola, N. Y. "TWO-CYCLE."

It would be interesting to note the performance of a car such as you outline; Ford uses the magneto in the flywheel; one flywheel will do quite as well as two; the blower idea is now used; the dashboard might well be clean; two-cycle, air-cooling is used to some extent; friction drives seem to be good; left-hand drive is used on the Ford; it would be up to you to make good.

You say "medium weight, power and speed; the engine would have the torque of a six-cylinder, four-cycle motor." That is the question: would it?

Your plea for simplicity is to be commended; the two-cycle motor you name is water-cooled, and it is not with a friction drive. In mechanical work it seems that conclusions in the absence of an actual trial are worth but little; it follows that jumping at conclusions ofttimes leads to mechanical indigestion. It is suggested that you, in your desire for simplicity, reach conclusions which have not been proven by the facts thus far, and it will be inconsistent here to make the same mistake. If you have the time, skill, patience and money to pay the piper you might be able to make good.

CRUST ON SURFACES OF COMBUSTION CHAMBER.

Editor THE AUTOMOBILE:

[1,755.]—I have a couple of questions I should like to ask:

1. Do you know if the chemical carbon removers advertised will remove the carbon from the cylinders almost as well as scraping by hand, yet with absolutely no injury to the surrounding metal parts in the cylinder?

2. I wish to have the foot accelerator to the gas throttle to a two-cylinder 1906 touring car changed to a stationary gas throttle as in all the late cars, and also to keep the accelerator in addition if possible. Do you know what would be the cheapest, best and most feasible way for having this done?

3. In the same car, which has a rear axle of the pin and key style, we have continual trouble with the pins breaking, especially on one side, where on one-half of the side of the keyway in the hub, the keyway is sheared away, i.e., partially broken. Do you think if we only had a new hub put on it would remedy matters? Also, my garage man says that although the pin may be broken (not the key which runs horizontal to the axle) there is practically no danger of the wheel coming off, as part of the broken pin always sticks through where the hub and axle join. Is this true that with a broken pin there is practically no danger of the wheel coming off?

4. The head of the muffler on the same car is broken in. As it has been on the car for over two years, I presume there is more or less back pressure. Hence I think a new muffler is needed. Do you consider a new muffler is the best and cheapest to put on again, or would you advise some other kind of muffler, and why? Is there any back pressure exerted by the mufflers, and do you consider that they muffle the sound as well as possible?

Pawling, N. Y. RONALD R. KELSEY.

The chemical carbon remover would save you much work and some cost; it probably will do the removing quickly and well. You must take into account the fact that all the crust is not carbon, and it is not possible to guarantee that the time required to clean the cylinders will be the same in each case. With the cylinders once cleaned out, you will be able to keep them so by the systematic use of the decarbonizer. No complaints have ever been made such as will indicate that the decarbonizer will "etch" the cylinder walls.

You probably would save money by having the company furnish you with the necessary parts by means of which you would be enabled to bring about a reform of the carburetion.

The fact that the pin breaks is assurance to you that the key is not tightly fitted. It is dangerous to run a car when the rear wheels are threatening to come off, even if it is a fact that they do not come off very often. The one right way is to have the keys fitted "tight"—as tight as possible. The average man is not capable of doing the work. When the keys are driven home see to it that they are free from oil, and clean out the keyway as well. The new muffler of the same make as the car should serve for you. Some back-pressure is to be expected; not enough to cause you over-much annoyance.

NOISE IS DUE TO INACCURACIES.

Editor THE AUTOMOBILE:

[1,756.]—Despite the greatest care, I am unable to make gears for the transmission system so that noise will be reduced sufficiently for the demands; I know that some transmissions are quite noiseless, and I want to know how the feat is accomplished. In my judgment much of the noise is in the gears; why should it be there when I take the greatest care, use the best cutters the market affords, and cut the gears as accurately as possible?

New York City. FOREMAN.

In the first place, you "use the best cutters the market affords." This is a sure sign of failure because the market affords

cutters for gears in which the error is admitted, in that they are approximately correct, since they are designed for a range of teeth rather than for a fixed number of teeth. A cutter to be absolutely accurate must be designed for the exact number of teeth in the gear-wheel to be cut. While the error is not great and the makers of machines in general consider the results "good enough," the fact remains that the error makes for noise, in a transmission gear case, in which thin walls accentuate the noise, however little it may be.

If accurate cutters are provided and the teeth are cut accurately, which depends upon the accuracy of the "dividing-head," on the one hand, and the sharpness, speed and feed of the cutter, on the other, provided the temperature of the material on the gear is not altered in the process, the result will be good if it can be claimed that the gears will run on the pitch-line when they are in place; nor must the spindles be limber.

If the gears are hardened it is plain that something will have to be done to compensate for the "swelling" tendency, and if the centers are changed (which is the superior way) care must be exercised to avoid an excess. Then there is the question of the sliding gears. If they are loose on the sleeve, and they will have to be if the shaft is long or if the sleeve itself is long, especially if the shaft is small and if a "broached" (square) hole in the gear sleeve is depended upon for the purpose. If the shaft is of considerable diameter, so that it will not spring, and if (instead of a square) the shaft is spline with six shoulders, against which the pressure will come, it is possible to consider a close sliding fit (with a short sleeve) and then the gears will mesh on the pitch-line, or so close to it as to assure nearly noiseless performance, provided the pitch-line velocity is little more than 1,000 feet per minute as an outside figure.

With all these matters carefully attended to, the remaining questions will be by way of good "silent" ball or roller bearings, and a shell (case) so thick that it will not serve as a "sounding-board" unless to a slight extent, which fault can be leveled by the use of a hard mineral grease, which will serve for the triple purpose: (*a*) serve as a lubricant for the gears, (*b*) dampen the noise, the volume that will follow if all the above precautions are observed, (*c*) serve as a protection for the metal parts, as against rust and other etching media; barring the presence of acids, etc., in the lubricant itself.

CARBON DECREASES IMPACT ABILITY.

Editor THE AUTOMOBILE:

[1,757.]—While I feel confident of the fact that carbon in steel is at the expense of the ability of the same to sustain under conditions involving impact, the fact remains that steel manifests notable peculiarities which would stand some discussion. Why is the steel B N D, as given by Mr. Fay, of high impact ability and at the same time low in elongation (per cent. in two inches), carbon decreases the elongation, and here is a case in which steel is high in impact qualities, and low in elongation; what is the explanation?

Staten Island, New York. J. F. O'D.

The steel as referred to by you is low in carbon (about 20 points), and it seems that the impact ability is lowered by the presence of carbon, rather than as the direct result of a low elongation. This phenomenon has been noticed many times, and if the steel is low in carbon, from ores and scrap originally low in metalloids, reduced in an acid-hearth, the strength can be increased enormously, at the expense of the elongation, in the heat-treating process (aided by alloys), and the fact that the elongation may be low (relatively) will not be a sign that the impact ability is low.

ARCHIMEDES DISCOVERED THE PRINCIPLE.

Editor THE AUTOMOBILE:

[1,758.]—Will you go back to first principles and explain the action of a float in a carbureter?

Camden, N. J. JUST-PURCHASED-A-NEW-CAR.

The "Principle of Archimedes" is concisely stated as follows: "A body submerged in a liquid appears to lose a part of its own weight, the amount lost being equivalent to the weight of an equal bulk of the liquid."

If, then, the body weighs less than the weight of liquid it would displace were it of the same specific gravity as the liquid, the "buoyancy" of the body would be as the difference in weight. It is this buoyancy which is taken advantage of, in that the float submerges partially, and as the gasoline raises in the bowl the float is resisted, in that the valve mechanism retards the float and the valve is closed by the pressure due to the buoyancy of the float.

IT HAS THE LOOKS OF POLISHED BRASS.

Editor THE AUTOMOBILE:

[1,759.]—I would like to know why, in the development of the automobile, the flexible tube connecting the hand bulb with the horn, still persists in writhing its tortuous course along the outside of the car, collecting dirt, preventing proper washing of the body and supplying additional brass work to be constantly polished? Are there known objections to permanent internal piping, with simple outlets at the bulb and horn for attaching same?

Very truly yours,

New York. F. W. FERGUSON.

If the internal piping is properly done it will serve the purpose, and if the objections named go for dissatisfaction it is easy to eliminate the flexibile tube on the outside. So many like the appearance of the polished brass on the exterior that a ready sale is assured and, after all, the vendors of the commodity are governed wholly by the fact that good business results. Then, there is the fact that the device does work extremely well, and utility does lend enchantment.

NEW FAN FOR A FRANKLIN CAR.

Editor THE AUTOMOBILE:

[1,760.]—Can you give me a diagram and show what material will be needed to put a fan on a 1904 air-cooled, four-cylinder Franklin automobile? A great many owners have put them on, and as I have one I would like to do so. I do not wish to use a gear unless I have to.

New York City. FLUSHING.

It might be well to consult the maker of the car; just the information wanted will probably result.

MUST SET SPRINGS HIGHER THAN USUAL.

Editor THE AUTOMOBILE:

[1,761.]—I notice a correspondent has a runabout on which the springs are too stiff, except when he adds a rear seat with a 400-pound load. His problem, which is to make the car ride easy with and without extra load, is an old one. It can only be solved approximately. Supplementary coils, to make the springs ride easy with the light load, would probably make them too easy under the added weight. Lighter springs with "helper" plates, or "bumper" coils are used in delivery wagons, but seem hardly suitable to a pleasure vehicle.

In the nature of a compromise, I suggest the following: As the springs are now too strong for a single seat, they should be lightened so as to balance the car, say to a capacity of about 100 pounds per inch depression. This is what suits the average runabout. The extra weight of 400 pounds, if directly over the axle, would depress the springs two inches, therefore they must be set that much higher than usual. Thus we shall have springs easy enough for the light load, while the additional strength for 400 pounds of extra load will be gained from the two inches of further depression.

This, of course, will make the car stand high behind under the light load, or low under the heavy load, or a little of both. This is the case with his present springs though in a lesser degree.

Chicago. WM. H. TUTHILL.

OVERLAND CYLINDER MEASUREMENTS.

Editor THE AUTOMOBILE:

[1,762.]—In your February 4 issue, under "Discrepancy in Horsepower Ratings," No. 1,730, in comparing motor sizes the stroke of the Overland motor is given as four inches. Again in the New York show issue of THE AUTOMOBILE and the same issue of "Motor Age," of Chicago, the stroke of the Overland is given in the list of specifications as four inches. As an owner of an Overland "30" to which the above refers, I beg to correct through your columns this misstatement, as the size of these cylinders is 4x4½, bore and stroke. I think your subscriber will find that most four-cylinder motors of this size on the market are rated at 30 horsepower, at a given engine speed.

Ashland, Ohio. C. A. HOFFMAN.

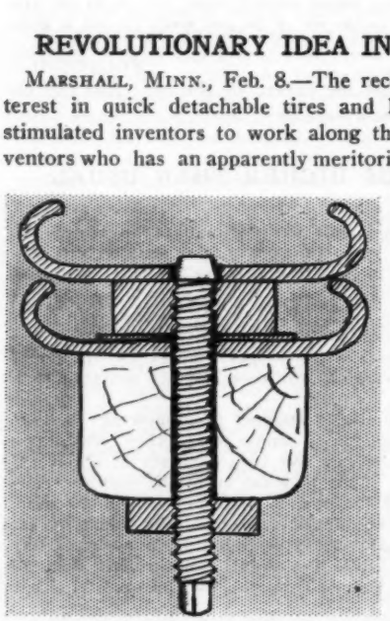
RAMBLER MAKES ITS WINDSHIELD.

In order that the windshield, which has become such a universal equipment on automobiles, shall harmonize with the general finish of the car, Thos. B. Jeffery & Company have decided to make their own shields for Rambler cars. The illustrations show the shield fitted to the new Rambler limousine with the upper half in three different positions. The shield is of heavy plate glass, with mahogany frame bound with brass, both of which match the finish of the dashboard. Stiff brass rods extending from the middle of the shield to the front of the bonnet insure that the frame will be stiff enough to practically eliminate vibration. An individual feature of the shield is the ability to locate the upper movable section at any desired angle, two large hand-operated clamps holding the glass in place. The wind is prevented from getting through at the joint, when the shield is raised, by a brass fixture.

The limousine, which is the highest priced as well as the highest grade Rambler product, is shown in the central illustration. This is in the nature of a new departure for the company, being the first production of an enclosed body, but the fine wood-working facilities, together with the long experience on finely built and finished touring bodies, have simply paved the way for this culmination of the body builders' art.

REVOLUTIONARY IDEA IN SPARE WHEELS.

MARSHALL, MINN., Feb. 8.—The recent great and growing interest in quick detachable tires and later in spare wheels has stimulated inventors to work along these lines. One of the inventors who has an apparently meritorious idea is Dr. A. D. Hard, of this city. He has patents pending on a device for fastening independent rims to wheels. A series of bolts occupying the lug and valve holes of the ordinary clincher rim as used in practice, and felloe, held in position by two nuts, one of which is adjusted to the space between the rims. The illustration shows a cross-section of an independent clincher rim held upon a common clincher rim by this device. The bolts resist sidewise stress and prevent the independent rim creeping. No bolt heads or nuts project. By its use cushion or solid tires may be quickly and securely attached to clincher wheels, and the diameter of the wheel is kept the same. This preserves the speed ratio, does not derange the speedometer, and permits of return to pneumatic tires at will. By carrying a cushion tire on an independent rim, the ready mounted tire can always be depended upon. Another use is to attach clincher rims to Fisk wheels. It only requires holes in the Fisk wheels to securely fasten clincher pneumatics. Another use is to secure to the clincher wheels tires which are larger in diameter than the former tires. Thus, it enables higher speed, or gives heavier tires, which wear longer. It is a very simple device, consisting for a common-sized twelve-spoke wheel of six bolts and twelve nuts.



Cross Section Hard Spare Wheel.

HERE'S ANOTHER WONDERFUL INVENTION.

GRAND RAPIDS, MICH., Feb. 8.—A recent invention of a local genius is of interest to automobilists, because it is applicable to electric searchlight, side light, and other lights. When so used it will require no wires, no attention, and cost nothing to operate.

Philip Young, an electrical engineer of this city, has discovered a method of supplying power to electric lights and motors without the use of wiring. His first experiments, which covered a period of two years, have been in the production of light. In this he has been successful, and lately has also produced current for a one-half horsepower motor.

The new lamp does not contain a storage battery, nor a dynamo, but generates its own electricity. The construction is amazingly simple. The base is a small cone-shaped contrivance, to which is screwed a regulation incandescent lamp. The electricity is generated inside the cone, which is only four inches high and an inch and a half in diameter. Inside this cone is a magnet cylinder which is covered on the outside much like an armature, and within which is a hard, white composition, the secret of the invention. It resembles carbon, only it is white instead of black. This composition in contact with the magnet creates the heat and produces light. It has a voltage of 110. The product will be placed on the market very soon by J. W. York & Son, manufacturers of band instruments.

The inventor has had one of the lamps in his home burning constantly since November 24. The members of the family say they use it as they would a lantern. It burns in any position. It is estimated that the lamp will burn for nearly a year.

It is the intention of the inventor to adapt it not only to ordinary electric lighting, but to automobile and other headlights, and to the running of motors.

The Imperial Automobile Club and the German Society of Motor Manufacturers and Traders have resolved to hold a combined motor boat and aeronautic exhibition in Berlin next year from March 1 to April 10. The industry will back up the promoters to the fullest extent and the primary arrangements have already commenced.

NEW YORK CITY CARNIVAL WEEK PLANS ARE MADE

ANOTHER week of festivities in automobile trade circles in New York City, made an annual affair after the phenomenal success attending the first one last year, is now being arranged by the automobile carnival committee of the New York Automobile Trade Association, which held its first meeting recently to outline plans. It was decided that the week from April 5 to 10 should be the one set aside for the celebration—one which will contain more elaborate and extensive features than the initial attempt and be concluded by a day instead of a night parade. The enthusiasm shown at the meeting presages success for the carnival, and the support of the whole trade is promised.

The affair last year was one of the most enlivening events in trade circles ever conducted, thousands of persons taking part, and hundreds of thousands coming from neighboring cities and towns to see the parades, decorations, cars themselves and contests. The crowds on the streets and the general spirit exhibited all over the city were evidences of the importance of the events, but it has been felt that many more would have taken part in the big parade of decorated cars if it were held at day. As it was, the length of the parade was exceedingly great, and some of the features of illumination were made possible by the darkness, but from present indications the greater preference for daylight affairs will offset this.

Another meeting of the committee will be held at an early date, when more of the details will be considered and further plans mapped out.

HERRESHOFF MAKES ITS METROPOLITAN DEBUT

THAT New York City awaited with interest the arrival of an entirely new production was well shown this week upon the appearance from Detroit of the first of the new Herreshoff touring cars, now being exhibited by Harry S. Houpt in the Rhinelander Building. A car which follows well-recognized lines of construction, with improvements claimed by the designer and makers, in both chassis and body, was what was seen by the many enthusiasts who have been following the progress of the car through the manufacturing stages as told by the pen of Advertising Manager West.

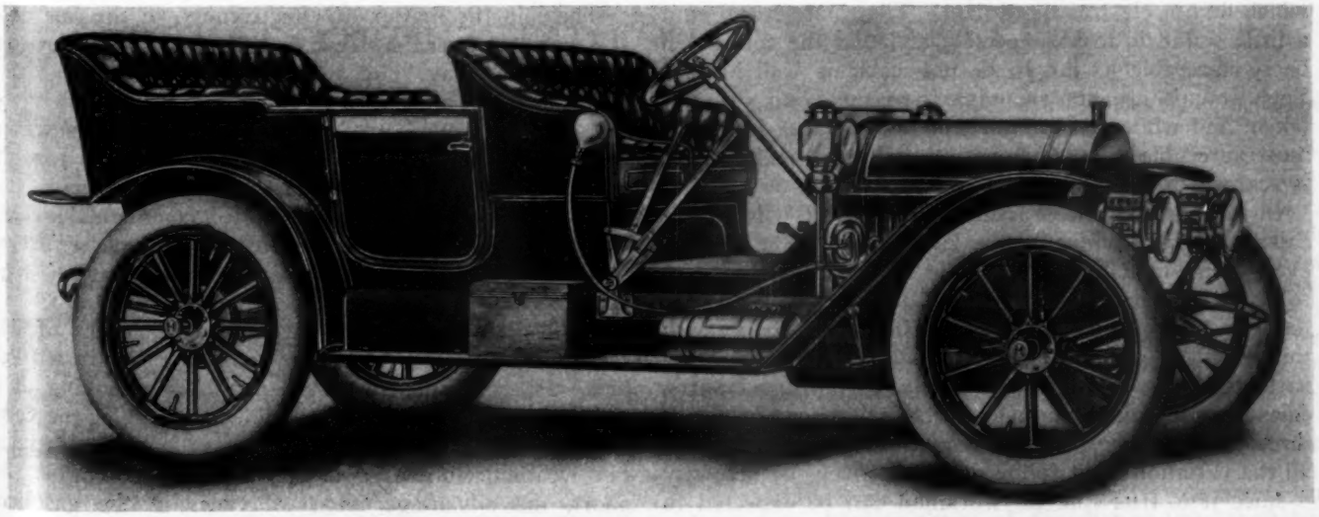
For many weeks the cars have been under way in the factory and tested on the roads so that it is expected from now on there will be a steady flow of the finished product to New York and other cities. For the moment however interest has centered in the advance guard, and the great number of people who have visited Mr. Houpt's new quarters have shown enthusiasm over it.

A four-cylinder motor rated at 24 horsepower, but which in brake tests is said to have developed 30, furnishes the power, with inlet and exhaust manifolds and a carbureter which were especially designed for it, and valve lifts, crankshaft and camshaft arrangements which show considerable ingenuity. The motor, clutch and three forward speed-selective sliding-gear transmission are an integral part. The power is transmitted by shaft to the live rear axle in a direct line, and with a gear ratio adapted to a maximum speed of from 45 to 50 miles per hour.

The car was designed primarily as a light machine of good class, suitable for owners of large, heavy cars in saving the latter from the wear and tear of use in cities, as well as for extended use by others in country touring and all-around work. Its light weight tends to lower tire expense and cost of operation, while at the same time ample power and effective springs make it suitable for use out of town and on any kind of roads. According to the statements of the designer, Charles Herreshoff, added efficiency at the rear wheels is obtained by a better co-relating of the component parts than in many machines of size and selling price of this one.

By virtue of improved design the motor, which is built by the American and British Company at Bridgeport, Conn., greater potential ability has been secured from a given cylinder volume than usual, and careful attention to the same principles was followed in making the other parts of the car. The contracts made by the Herreshoff Motor Company, of Detroit, with the firms furnishing materials call for the same quality as are employed in the best American and foreign machines. Many of the manufacturing processes are carried on in the new factory.

In body equipment the car compares favorably with any of its size, giving ample seating capacity for five persons, the front seat being divided, and all upholstered in fine grain leather. Curved and enclosed fenders protect the passengers from flying mud and dirt. It is planned to produce about 1000 of these machines for the 1909 season, 200 of which are intended for New York City alone, while almost the entire output will be marketed in the East. The Middle, New England and Central States are included in this, and the West will not be taken up until 1910.



Herreshoff 24-H.P. Touring Car, with Straight-Line Shaft Drive and High-Duty Herreshoff Motor.

THE AUTOMOBILE

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SILENT PERFORMANCE NOW NECESSARY.

Automobiles were once quite up to the scratch from the point of view of noise; all the kinds of noises possible in machines emanated from the bowels of some of the earlier types of cars. As it is at the present time, cars must perform noiselessly to be regarded as up to a fitting standard. In this connection it becomes necessary to define what will be regarded as noise relative to sounds which do not class as discordant. That motors will emit a little sound is to be expected, and that the sound can be so agreeable as not to be noticeable is well known. Such sounds are not as noise from the point of view taken, and while absolutely silent performance would be most agreeable, the fact remains that such performance is scarcely to be expected.

In the meantime it is assured that noise is wholly uncalled for, and many are the automobiles to be seen at every hand in which harmony is so entwined as to resolve all sounds into the class called agreeable. That modern transmission construction has a lot to do with this noiseless performance is assured, and the reasons lie in better material, more accurately proportioned parts, thicker walls, and micrometer fits; taking into account limits of tolerance, which automatically compensate for all the variations that follow in the footsteps of necessity —since it is true that no workman can be expected to arrive at the point—on the road called excellence, so very far that a one-inch plug will go into a one-inch hole.

Gears are now so well made that they will run on the pitch-line, despite the fact that they have to be heat-treated after they are machined; the teeth are so nicely fashioned that they "mesh" to a nicety, and the surfaces roll on each other almost to the entire exclusion of shock, jar, or rubbing. Bearings now do justice to the fine work which prevails throughout the rest of the system, and the spindles are short, of great rigidity, and of such fine material that "flexure" is reduced to the point below which its presence makes for noise. The end is that transmissions are efficient, and they will last for a long time; life and efficiency are as companions.

If healthy conditions can be regarded as present in a new car, it is the duty of the purchaser to make the residence in the car so inviting as to prolong the visit for the greatest possible length of time. Better yet, to make the conditions so happy as to render the home—if such it may be called—permanent. It is a simple process; noise, and what it entails, will never dispossess silent performance in a car that is well oiled, and in which the "silt" of the road is not invited, even for a temporary sojourn.

* * *

COMMERCIALS WORK IN BAD WEATHER.

A little slippery weather, of which the past two weeks have afforded a few striking examples, serves well to emphasize the advantages of the commercial power wagon over the horse in respect to tractive effort and reliability. A common sight, when the streets are icy, is a horse slipping, slipping, all over the pavement unable to get a secure footing. Almost as common is the sight of a crowd collected in the middle of the street around a wagon, denoting that a horse has fallen to the pavement. The power wagon, on the other hand, to which the streets all look alike, glides by the fallen horse with its perplexed driver and the advising crowd just as if there were no such thing as ice and snow. One can almost imagine the latter as it passed the horse saying with a snort, "competition, humph"! On these days, so common in a hard Winter, the effective radius of the horse is reduced to about ten miles; that is, that distance would constitute a day's work. On the other hand, there is no diminution of the truck's effective radius.

Then, in the matter of effectiveness, in the one case, the animal must be treated with extreme care; one might almost say "like a baby," else accident or death may result, meaning delay and a consequent heavy expense for a new horse. With the machine, however, no babying tactics are necessary; a day's work is the same, weather or no weather. The heavier loads carried and the great improvements in commercial vehicle tires have so increased the effective tractive effort as to make the vehicles practically independent of road conditions.

With the coming of hot weather, the scenes of distress are repeated with the same poor hard-worked brute as the chief actor once again. So looking at it from all points of view, it would appear as if the commercial vehicle has the advantage in cold weather, in hot weather, and, of course, in moderate weather; in short, the advantage is at all times in the gasoline-driven machine.

RACING CONTROL IS NOW UNDER A REVISED PLAN

HARMONY in the automobile racing situation seems to be a well-nigh accomplished fact in this country, a condition which has been a stranger to American contest circles for many long months, and all this was secured as a result of a number of meetings held in Chicago during the show.

While the Contest Board of the A. A. A. will have matters in charge, with power to grant sanctions, in all of its actions it will be, more or less, advised by a committee representing the Association of Licensed Automobile Manufacturers, the American Motor Car Manufacturers' Association, and the Importers' Automobile Salon.

The movement which has culminated in this amicable agreement is not a new one and has been slowly attaining importance for some time. In January, during the Madison Square Garden Show, a number of manufacturers met and decided to form a Manufacturers' Contest Association at Chicago; and this was done, membership being limited to makers who have built fifty or more cars, and importers who have brought a like number to this country, although non-members will still be eligible to compete in events. The organization was completed by electing Benjamin Briscoe, of the Maxwell-Briscoe Motor Company, as president; W. E. Metzger, of the E. M. F. Company, as secretary-treasurer; Russell A. Field, of New York, as his assistant, and Howard E. Coffin, of the Chalmers-Detroit Company, as chairman of the committee on rules.

Of the twenty-five members constituting this body, the following five were selected, with Mr. Coffin, to act as an executive committee: Elmer Apperson, Apperson; George Weidley, Premier; Paul LaCroix, Renault; A. L. Riker, Locomobile, and one other yet to be announced. It was then that a committee was appointed which should confer with the A. A. A., and this was composed of Howard E. Coffin, Alfred Reeves, of the A. M. C. M. A.; E. P. Chalfant, of the A. L. A. M., and E. R. Hollander, representing the importers.

At the same time the Executive Committee of the A. A. A. was preparing to meet the manufacturers half way by authorizing the appointment of a committee to confer with them and composed of F. B. Hower, L. R. Speare, Powell Evans, and F. H. Elliott. This body, together with those from the M. C. A., composed the court which took up the matter of a joint and harmonious action in controlling automobile contests in America, on road and track, and the questions discussed were those which have been bothering autoists all over this country and have even affected the makers in Europe. Supporters of the A. A. A. have at times seen reason to criticize, but at the same time have realized that the only solution of the problem could be through a national body vested with complete but advised authority.

The result has been satisfactory so far, and with men who are thoroughly familiar with the conditions, discussing and arranging them, it is felt by those most vitally interested that a staple condition will be obtained. The manufacturers have made it plain that they do not wish to become identified with the promotion of the contests, but at the same time that they should be consulted, that they desire to have the number of races limited, and both the races and endurance runs supervised in regard to rules and other regulations. The A. A. A. committee has reported favorably upon the arrangement whereby it should have control of these affairs with an advisory board from the M. C. A., and it is assured that on March 2 this will be ratified at the meeting of the executive committee of the A. A. A. in New York

Of premier importance to makers was the proviso adopted that all rules for contests of a certain year must be published by September 1 of the preceding year, thus those for 1910 events will be given out next Fall, and at the same time this makes the rules adopted for this season's contests and already considered remain in force. One point which was brought up was the attitude of the A. A. A. toward racing on one-mile tracks, a practice which it has recently refused to sanction, and this difficulty has been overcome by the recommendation that the national body again sanction these meets, but with the understanding that some representative of the Contest Board must be in attendance.

Still another phase to be considered was that of the term "international," which will be so defined that a promoter cannot dodge the issue of obtaining a sanction by simply enlisting a few foreign cars and then calling the meet an international one. It is the general opinion that whatever differences of opinion have arisen in the past among the various motoring organizations as to the status of this term will not be reopened.

This condition of racing affairs is one that will undoubtedly be of great benefit to the industry, to the sport, and to the realization that there must be a national governing body, and that if the latter has been open to criticism in the past, that fact does not give a reason for belittling the necessity for it.

The Contest Board of the A. A. A. is composed of Frank B. Hower, chairman; Frank G. Webb and A. L. McMurtry, and the Advisory Board, A. L. Reeves, E. P. Chalfant and E. R. Hollander. Some autoists feel that it would perhaps be better to have a separate board for speed races, leaving touring contests under the control of the present body, but at present the existing arrangement seems to be the program.

TRANS-CONTINENTAL CONTEST TO SEATTLE FAIR

A TRANS-CONTINENTAL endurance run from New York City to Seattle on account of the Alaska-Yukon-Pacific Exposition, which opens in that city on June 1, is the latest competition proposal in autoing. From the interest already taken in the event it may become a real cross-country race with a goodly number of foreign and American entries. The trophy presented by M. Robert Guggenheim, valued at $2,000, gives this title to the contest: "An International Contest for the M. Robert Guggenheim Trans-Continental Trophy and Cash Prizes, under the auspices of the Alaska-Yukon-Pacific Exposition and of the Seattle Automobile Association."

John Kane Mills and T. Francis Moore, of New York City, have been given charge of the affair, and for two months they have been working upon routes, rules and plans in general, and on Monday evening of this week the latter member of the firm started for Seattle with the tentative rules and regulations in his pocket. With the directors of the exposition these will be taken up in detail and a definiate understanding made as to the conduct of the contest.

Starting either on May 15, as desired by the Westerners, or on June 1, as suggested by the New Yorkers, it is generally thought that the winner will take about twenty days to make the run across the country over a route about 3,900 miles in length, with few rules, few checking places and in many cases far enough away from railroads so that the cars will be competing under touring conditions. As proposed, the route taken will lead the cars from New York City to Albany, Buffalo, Cleveland, Chicago, Clinton, Ia., Dennison, Neb., Omaha, North Platte, Cheyenne, Wyo., Granger, Pocatello, Montpelier, Boise, Burns, Salem, Portland and into Seattle. The only new part of the course will be that west of Granger, nearly all of the others having been covered in previous contests.

Already five foreign car entries are promised, with famous touring drivers slated to appear on American soil to try again to

make a better showing than in the last race across the United States. American cars are assured by both makers and dealers, and the dates proposed will be such as to cause no conflict with the annual tour for the Glidden Trophy, which usually starts the second week in July.

Of rules there are few, advisedly so because the contestants will not travel in numbers, and the ones gotten up must be sanctioned by the Seattle people before being given out. It is known, however, that it will be a case of first into Seattle to win the trophy and $2,000 in cash, with enough intermediate checking stations to prove that the cars have been driven over certain routes. A list of hotels will be compiled at which the night and day clerks will be the official checkers. No observers will be carried, and the cars can be rebuilt if necessary, except in the case of the frame, which is considered the car's foundation.

The rule which has caused widespread comment, however, is that although drivers may be changed or relayed, yet they cannot leave the car in which they started, and when tired and sleepy must fall back into the tonneau to get their rest. Of trophies and prizes there are enough to satisfy those who qualify, the winner getting $2,000 besides the trophy; the second car taking $1,500; the third, $1,000; the fourth, $750, and the fifth securing $350. In case an amateur does not wish to take cash, plate may be substituted.

There is time enough before the start for such a thorough discussion of the points that it is expected that all will be clear and well arranged and there is extended interest even at present hinging over the rules. It has been suggested that to eliminate somewhat the grind upon the participants that at least two stops of twenty-four hours each shall be included, one at Chicago and the other at Cheyenne.

Just how this race will affect the one planned by the New York *Times*, to start for San Francisco on the fourth of July, is not known, some thinking that perhaps the one contest will do for both and that a second one would not be attempted, others thinking that perhaps both might be combined on the earlier date.

FOUR PERFECT SCORES IN ROCHESTER MID-WINTER RUN

ROCHESTER, N. Y., Feb. 15.—Of the sixteen cars entered in the Rochester Automobile Club's first annual mid-winter endurance run, four finished without a single demerit charged against them. Of these, two were in Class A and two in Class B. A source of great local pride is the fact that three of the four to go perfect were born and brought up in Rochester, so to speak.

To put it mildly, the weather conditions were fierce. The drifts encountered were fully as bad as those which the New York-to-Paris racers ran into just a year ago, the snow being fully four feet deep in places. The wind, a 40-mile gale, blew right into their faces for half of the trip. Not a few of the drivers had fingers or toes frozen, while all of them were bundled up so that movement of any sort was unpleasant. In one case this was the cause of a demerit, as Driver Davis of No. 1 Gaeth ran into a snowbank and while trying to throw the clutch his feet became entangled in the robe and the engine stalled. This cost him one point.

All of the starters reached Buffalo except two, but the road beyond that city was the scene of the first and only serious accident. This happened to No. 9, Selden, driven by Hector Caramella, which was going at a fair clip towards Rochester when, upon rounding a curve, another car was overtaken. Not having time to bring his machine to a stop, Caramella drove up an embankment at the side of the road. This caused the car to turn turtle, throwing the occupants out.

No. 7, Selden, driven by Charles Young, set out at the start to go over the route as quickly as possible, and was promptly disqualified for speeding. Young arrived in Buffalo two hours ahead of the pacemaking car and promptly started back. He finished over five hours ahead of the bunch. The result of the contest was that two cars finished with perfect scores in both classes. These are No. 5, Selden, driven by W. C. Barry, Jr., and No. 10, Gearless, driven by F. C. Shannon, in Class A; No. 6, Selden, driven by Henry Selden, and No. 15, Cadillac, with Richard Guyer at the wheel carried off the honors in Class B.

The club officials have announced that some day next week the double tie will be run off to determine the possessors of the silver cups. This run-off will probably take place over a different route than the contest, but this route has not yet been announced.

These were the participating cars:

Number	Car	Entrant	Driver	Result
5 A	Selden	W. C. Barry, Jr.	W. C. Barry, Jr.	Perfect
10 A	Gearless	Gearless Co.	F. C. Shannan	Perfect
6 B	Selden	H. R. Selden	H. R. Selden	Perfect
15 B	Cadillac	Mabbett & Betts	R. Guyer	Perfect
1	Gaeth	Outhout & Henry	O. W. Davis	1 Point
3	Cadillac	Mabbett & Betts	H. Pye	1 Point
2	Cadillac	Mabbett & Betts	Betts	.....
4	Oakland	L. B. Kirkpatrick	Mercier	.....
11	Buick	C. L. Whiting	C. L. Whiting	.....
13	E-M-F	Peck &Brooks	Peck	.....
14		Peck &Brooks	Brooks	.....
7	Selden	Geo. B. Selden	C. Young	Out for speeding
9	Selden	Selden Co.	H. Caramella	Out—overturned
12	Buick	C. L. Whiting		Out

FLORIDA'S 1909 BEACH RACES.

New events and classifications have been prepared for the annual races on the Florida beach, which will be run this year at Daytona from March 23 to 26, under the patronage of the Florida East Coast Automobile Association and promoted by the Motor Contest Association, Inc., of which Senator W. J. Morgan is manager. Price and piston displacement have been used to divide the cars in the longest of the events. Twenty-two races altogether have been scheduled, of which only ten are for autos, the others being for motorcycles, bicycles and aeroplanes.

At 200 miles each are the Florida stock car and piston displacement races, with first, second and third moneys in each and an additional one for the driver doing best in both. The regular race for the Minneapolis trophy will be held, as will also that for the Two-mile-a-minute Speed Crown and the mile time trials for the Sir Thomas Dewar trophy. An international free-for-all at one, five and ten miles; a Southern price and horsepower handicap; a Vanderbilt Cup competitors' race, and an invitation match race for George Robertson, Louis Strang, Herbert Lytle, Ralph De Palma and other noted drivers complete the list.

NATIONAL'S THOUSAND A DAY.

INDIANAPOLIS, IND., Feb. 16.—The National Motor Vehicle Co. has come to the front with a brand new proposition in automobile circles. One thousand miles a day for ten days is the modest feat the company will attempt some time in May or June.

Arrangements have already been completed to have the event on the track of the Indianapolis Motor Speedway Co., which is now being built, and will be completed some time between May 15 and June 1. The 1,000 miles a day for ten days event will be among the first on the speedway.

WANTED: A BRIARCLIFF QUORUM.

NEW YORK, Feb. 16.—Lack of a quorum to-day prevented, for the second time, a meeting of the manufacturers' committee in charge of the Briarcliff race, and again it was postponed, this time until next Monday, when it is hoped that all the members will have returned from Chicago and attend. In the meantime, as the date desired for holding the contest approaches, the probability of securing acceptable rules diminishes.

CLUB GOSSIP FROM FAR AND NEAR

OLD BICYCLE CLUB BECOMES NEW AUTO BODY.

PHILADELPHIA, Feb. 15.—On Friday evening last, at its handsome home, 1606 North Broad street, there was effected a reorganization of the Century Club (formerly the Century Wheelmen), whereby, by the addition of a half-hundred new motoring members to the score or more already on the rolls, the famous old organization will seek future fame under the title of the Century Automobile Club.

Something less than a decade ago the Centuryites had a strong automobiling element in their membership—so strong, indeed, as to warrant the officials in transforming the club's huge wheelroom into an up-to-date club garage. Two or three years later, with the formation of the local automobile clubs, Century's motoring element drifted away, and the bowling craze having just about that time hit the city, the club management effected another transformation in the erstwhile wheelroom by installing four up-to-date alleys, and the Century Club (the "Wheelmen" having been discarded some years before) pursued a quiet existence as a social club.

Always wide awake, the Centurians some time ago saw an opportunity of injecting new life into their organization by offering inducements to local motorists to join them. The principal one of these was the club house itself, the only other autoing organization in the city having one being the Germantown Automobile Club.

In announcing its future policy, a prominent official of the club said that endurance runs, hill climbs and other contests would be promoted by the club at suitable intervals, but that it would be the primary object of the contest committee—which, by the way, is to include only men not connected with the trade—to formulate a set of rules which will give the private owner a chance with the entrant who is in the trade, and who, therefore, has an undue advantage over the "layman." This will be brought about by making separate classes for private owners and trade members. To insure absolute justice in the contest committee's decisions, a rule will be formulaated to debar from service on the committee, for the time being, any owner who may have entered a car in the run or hill climb or other event than *en tapis*. This radical rule will. it is hoped by the Centurians, effectually prevent the bickerings, protests and heartburnings which have invariably followed the contests promoted locally heretofore.

NON-OWNERS MAY JOIN A. C. A.

NEW YORK CITY, Feb. 15.—A new class of membership has been adopted by the Automobile Club of America for persons interested in automobiles but not owners of them. This will be known as "Clubroom membership," with the privileges of the assembly, grill, billiard and general social rooms and the library, but without those necessary to owners of cars, such as the garage facilities, touring information and maps.

The new class is limited to 100, and will allow those elected to it to enjoy the benefits of the luncheons, lectures and entertainments given by the club. There is no initiation fee attached, and the annual dues are $25.

CHATTANOOGA PLANS CARNIVAL.

CHATTANOOGA, TENN., Feb. 15.—Under the auspices of the Automobile Club of Chattanooga a carnival will be held on March 16, 17 and 18. A hill climb will take place on Lookout Mountain. and speed contests on a mile track at Olympia Park. Three cups for the latter have been offered, one by the Chattanooga Automobile Club, one by the chamber of commerce, and the third by the Patten Hotel. The trophy for the Lookout Mountain climb has not been decided upon. The danger of the latter course has been lessened lately by the placing of heavy fences at danger points.

ILLINOIS STATE ASSOCIATION REJUVENATED.

CHICAGO, Feb. 15.—The effort to rejuvenate the Illinois State Automobile Association has been successful, a new set of officers being elected and an active campaign planned. L. E. Meyers, of the Chicago Automobile Club, was re-elected president of the State associations, while George W. Ehrhart, of Decatur, was chosen first vice-president; R. A. Whitney, of Peoria, is the new second vice-president, and E. W. McCready, of Chicago, third vice-president. F. H. Trego, secretary of the Chicago Motor Club, will officiate in the same capacity in the State association, while John Farson will look after the finances. Directors chosen were A. J. Olson, Woodstock; R. H. Colby, Aurora; R. A. Baker, Springfield; W. H. Van Dervoort, Moline; J. C. Dickerman, Rockford; David Beecroft, E. Lewis Kuhns, Joseph F. Gunther and Sidney S. Gorham, Chicago.

Committees appointed were as follows: Revision of by-laws, F. H. Trego, E. W. McCready and S. S. Gorham; State reorganization, George W. Ehrhart, R. A. Whitney, R. A Baker, J. C. Dickerman and H. Tucker; trade affiliations, Henry Paulman, E. Q. Cordner, Edward Rowen and David Beecroft; finance, P. J. McKenna, W. Hildreth and H. Paulman. The work of the association for the coming year will be along the line of securing favorable legislation for motorists, co-operation in the improvement of the State roads, signboarding, the securing of discounts on motor car supplies for members and uniform laws for the central West.

HARTFORD CLUB TO HOLD SPRING RUN.

HARTFORD, CONN., Feb. 15.—Four stages of fifty miles each, making a total of 200 miles, will be the distance to be covered by the contestants in the endurance run which will be held by the Automobile Club of Hartford on May 22, with Hartford the starting and finishing point of each lap, and roads in various directions being chosen as the routes. This was decided at a meeting of the club when plans for the contest were brought up. The idea of having the competing cars pass through Hartford as many times as possible was a popular one.

The first lap will be from the start to New Britain, Meriden and Farmington back to Hartford, a route which will give the cars some climbing over the Southington Mountain. The second stage is to the east, over some rough roads, through Manchester, Hazardville and Windsor; the third is down the Connecticut Valley to Middletown, Portland, Glastonbury and back to Hartford. The final lap will take in Bloomfield, Granby, New Hartford, Canton and over the Talcott Mountain to the finish. There will be three classes for cars: Class A, for cars costing less than $1,500; Class B, for those costing from $1,500 to $3,000, and Class C, for those costing more than $3000. There will be cups for first and second place in each class.

Time penalties will be figured at one point for each minute lost, and gasoline engines must be kept running except at the noon control. Stops for tire trouble and for traffic will not cause penalties if motors are kept running, and the time will be added to the schedule by the observer. For any breakage or deformation of springs, spring hangers, frames or axles there will be a penalty of 60 points for each part.

SAVANNAHIANS TO DINE JACKSONVILLIANS.

SAVANNAH, GA., Feb. 15.—On Washington's Birthday the Savannah Automobile Club will give an oyster roast at King's Ferry. This place connects Savannah with Bryan county, and to it is one of the most beautiful roads in the State of Georgia. The Automobile Club of Jacksonville will be invited, and so will be Governor Hoke Smith and Governor-elect Joe Brown. From the Savannah club will be Frank C. Battey, R. M. Hull, Mayor George W. Tiedeman and Harvey Granger.

News in General

Governor Magoon Uses Franklin Car in Final Cuban Inspection.

White Plows White Snow.—The record-breaking snowfall in Milwaukee last week furnished ample opportunity for Milwaukee dealers to demonstrate the worth of the motor car as a winter vehicle. D. W. Stewart, manager of the White Co.'s Milwaukee branch, and the Hokanson Automobile Co., agents for the White Steam car at Madison, Wis., the state capital, took full advantage of the snow and pushed through drifts that horses and street cars could not buck. In Milwaukee a White steamer pulled the plow that cleared off the snow on all walks in the plant of the Schlitz Brewing Co. At Madison the White made a trip from the garage to the car barns of the street railway company without a hitch and while all street cars were tied up by drifts.

Far Western Drivers Will Climb Hills.—One of the greatest events of the year on the Pacific Coast is the annual Pasadena-Altadena hill climb. This will be held on Washington's birthday, which is a few weeks earlier than last year, the change being made on account of the rainy weather of previous years. Nine classes have been listed, differing as to price, and one special for the four fastest cars in the other nine events. The latter was won last year by Apperson in 1 min. 36¼ sec., and Edgar Apperson himself will be on hand to drive the "Jackrabbit" this year.

Want Oldest Electric.—Two prominent historical museums of this country are now endeavoring to secure from the Baker Motor Vehicle Company for permanent ownership, the Baker electric which has the honor of being the first of its kind built in this country. This car is wanted to add to collections of the first cars made, to contrast with those of the present time as showing the advance made in methods of road locomotion and it will undoubtedly be donated. This electric is said to be a fine type to contrast with the modern beautifully finished machines because of its century-old and general thrown-together appearance.

New Tire From Trenton.—The United and Globe Rubber Manufacturing Company, of Trenton, N. J., has gone into the field of automobile tire manufacturing with a pneumatic tire which will bear that name. A section of the firm's factory has been set apart for the necessary machinery, vulcanizers, etc. John S. Broughton, secretary and general manager, as well as Watson H. Linburg and Welling G. Sickel, other members of the firm, have had their cars equipped with experimental tires for some time to give them road tests and have found them to be highly satisfactory.

Pittsburg Buys a Pierce Arrow.—The city of Pittsburg is now the owner of an automobile. The purchase has just been made by the department of public safety, bureau of police, the choice being a Pierce-Arrow of 40 horsepower. It is the intention to use the car principally for riot and emergency calls. To that end dash cabinets have been arranged to carry revolvers and handcuffs, while heavy holsters, large enough to hold three high-power rifles, are attached to the back of the front seat. On the running boards are two large-size fire extinguishers.

The Goodrich Girl for 1909.—Adele is the Goodrich girl for 1909; "messenger, advocate, sweet persuader, reminder—and withal a rare, wistful, restful companion—just the sort for a man to take into his confidence," is the manner in which her sponsors describe her. Adele is the girl of the poster that the B. F. Goodrich Company, Akron, O., is sending out for the year 1909, in accordance with the now long-honored custom of this company. The Goodrich girl has become as famous as the Goodrich rubber products.

Trenton Dealers Organize.—Automobile tradesmen in the Jersey capital have organized the Trenton Automobile Dealers' Association with the following officers: President, R. C. Manning; vice-president, U. G. King, and secretary-treasurer, John L. Brock. A committee on automobile exhibit is composed of S. E. Kaufman, Walter Slack and Harry Stout. The coming show was taken up for discussion and this committee will have it in charge. Sixty cars are expected to be shown.

Packard Warehouse in Long Island City.—Extensive plans for a nine-story warehouse to be built in Long Island City for the Packard Motor Car Company of New York City, have been made by architects Albert Kahn and E. Wilby, of Detroit. The building will be used to relieve the congestion at the New York house, and in it will be room for storing cars for future delivery, repair shops, body building, and repairing departments.

Wagner-Field Company.—Automobile advertising and publicity handlers, has found larger quarters necessary to accommodate a growing business and staff and has moved into offices on the first floor of the Thoroughfare building at 1777 Broadway, New York City. H. M. Worth Colwell has joined the literary forces, and Burr Edwards Giffon, formerly with the Bates Adevertising Agency, has taken charge of the art department.

Change in Sales Methods.—The "Long-Arm" System Company, of Cleveland, announces that dating from February 15, 1909, the sale of its products will be conducted by the company direct. This change is made with a view to getting clearer business understanding and closer engineering touch with customers. Correspondence relating to all matters should be addressed direct to the company.

Studebaker Officers Unchanged.—The Studebaker Automobile Company at its annual meeting re-elected its present officers for the ensuing year. They are: Col. George M. Studebaker, president; Nelson J. Riley, vice-president; Clement Studebaker, Jr., secretary; Charles A. Carlisle, purchasing agent; Hayden Eames, Cleveland, general manager.

PERSONAL TRADE MENTION.

E. T. Birdsall has resumed his practice as a consulting engineer in New York City, opening offices at 41 West 63d street, and intends to make a specialty of the design and operation of commercial vehicles. He will also design gasoline engines for all purposes, make tests and appraisals. An automobile brokerage department has been opened for the benefit of prospective purchasers either of new or second-hand cars, expert advice being given. Mr. Birdsall has now had ten years of experience in the automobile manufacturing field and twenty-two in general engineering.

W. McKean White, formerly a Philadelphia automobile writer, has joined the editorial staff of THE AUTOMOBILE. Mr. White has been handling the automobile news for the *Evening Times* of Philadelphia since the Glidden Tour of 1908, previous to which for two years he had charge of similar work on the Philadelphia Press. Before entering the news field he was connected with the automobile trade in sales capacity, starting with Martin & Hart, at that time the Philadelphia agent for the Thomas and Cadillac in 1905, and later being with J. Hervey Nichols, the agent in Denver for the Winton and formerly the Oldsmobile.

Walter C. White at Show.—Walter C. White, the second vice-president of the White Company, in visiting the Chicago Show made his first appearance since his accident last spring at Cincinnati. Six months of residence in hospitals followed that, but he has fully recovered and is again in charge of the selling part of the White business. His arrival at the show was the beginning of an impromptu reception at the White exhibit.

Charles S. Monson has been secured by Gray and Davis of Amesbury, Mass., to act as western sales manager. Mr.

Monson has been the manager of the Detroit G. and J. Tire Company's branch for the past three years, previous to which he was with the Hartford Rubber Works for about four years and from 1893 to 1900 was salesman and superintendent of agencies for the Gormully & Jeffery Manufacturing Company.

A. R. Pardington, vice-president and general manager of the Long Island Motor Parkway, Inc., has accepted the chairmanship of the automobile committee of the Queensboro Bridge celebration, which is to take place during the week of June 12-18. An elaborate program of special interest to automobilists will be arranged, and a large attendance is already assured.

E. Roger Stearns, formerly manager of the Buffalo branch of the Ford Motor Company, has become assistant to N. A. Hawkins at the Detroit factory. Mr. Hawkins will assume many of the duties of vice-president James Couzens, who is going to do some pleasure traveling in this country and abroad during the next six months.

M. B. Leahy, formerly assistant manager of the Buffalo branch of the Ford Motor Company, has succeeded to the managership through the transferring to Detroit of E. Roger Stearns. Mr. Leahy's promotion comes in line with conscientious and faithful service and is well merited.

R. A. McNeilly, who has been connected with the Pope Manufacturing Company of Hartford, Conn., for the past five years, has resigned from that concern and in the future will be connected with the Boston branch of the Rambler Automobile Company.

Alfred Reeves, James Couzens and D. J. Post.—This trio left on Wednesday for a "rest" round of the Florida resorts, intending to go South as far as Miami and catch sharks and other denizens of the deep.

Edgar E. Mason, who has been connected with the Oakland, Cal., branch of the Auto Vehicle Company, has been appointed manager of the San Francisco branch of the Durocar Manufacturing Company.

George Jordan is now the manager of the Cameron branch in New York City, located at 231 West Fifty-fourth street.

DINNER GIVEN BY WOODS.

CHICAGO, Feb. 15.—On the top floor of its new factory, where a dining room and vaudeville stage had been installed, the Woods Motor Vehicle Company last Wednesday evening gave a dinner and entertainment to a number of the visiting tradesmen and press representatives. It was conveniently held after the show had closed for the evening and when artists from leading theaters could be present. Woods electric batteries furnished a brilliant illumination. Among those present were the following: H. S. Firestone and R. J. Firestone, president and sales manager, respectively, of the Firestone Tire and Rubber Company; H. Harmon, of the solid tire department of the Diamond Rubber Company; G. H. Atkins, manager of the Electric Storage Battery Company, and William Neath, engineer of the same concern; W. H. Mason and E. P. Rowan, of the Hartford Rubber Works; C. E. Whitney, of the Whitney Chain Company; Courtland Cramp, of the Cramp Shipbuilding Company; L. M. Wainwright, J. W. Sprag and W. P. Culver, of the Diamond Chain Company; C. F. Van Sicklen, William Shepard, H. A. Goddard, and representatives of the daily and trade papers.

GENERAL MOTORS SEEKS SITE.

LANSING, Mich., Feb. 15.—The General Motors Company, the recently formed New Jersey corporation, is seeking a location for a plant for the manufacture of gasoline engines. C. R. Hathway, of Detroit, treasurer of the company, has just addressed a letter to the Lansing Business Men's Association, asking for proposals and information regarding taxes, lighting, power, water and other facilities, stating that the company will need about 100 acres of land.

IN AND ABOUT THE AGENCIES.

Studebaker, Baltimore.—Dixon C. Walker, one of the best-known members of the Automobile Club of Maryland, has just closed a deal for the local agency of the Studebaker electric and gasoline cars. Following this up Mr. Walker leased, late Saturday afternoon from the American Ice Company, the site at 1917-19 North Charles street.

Goodyear, Boston.—So great has been the increase in the business handled by the Boston branch of the Goodyear Tire & Rubber Company that enlarged space has been necessary. This led to the purchase of a lot and the erection of a large five-story building, which has now been occupied.

American, Hartford, Conn.—R. D. & C. O. Britton have added the American roadster to their line now comprising the Maxwell and the Stoddard-Dayton. This is the first time that the western car has been represented in this city.

Peerless, Olds and Apperson, Pasadena, Cal.—Harry D. Pyle, of the Central Garage has announced that his firm has taken the agency in Pasadena for the Peerless, Apperson and Oldsmobile lines exclusively.

Babcock Electric, Rochester, N. Y.—A new firm known as the Gable-Hill Company has taken the agency for the Babcock electric carriages. They will also carry on a general repair and jobbing business.

Gaeth and Chalfante, Baltimore.—The Gaeth and Chalfante cars are being sold in this city by F. W. Sandruck, who has been given the agencies. Mr. Sandruck is located at 915 North Howard street.

Haynes, Evansville, Ind.—The local agency for the Haynes automobile has been taken by H. R. Fullenwider, in connection with the Richmond and Auburn cars, which he is now handling.

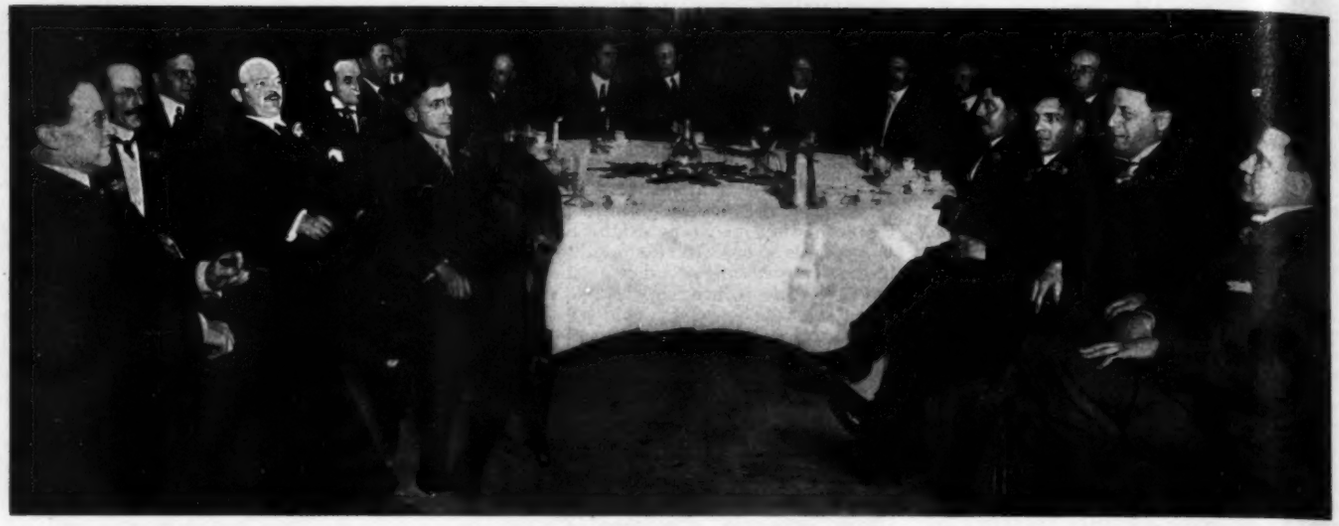
Mitchell, Newark.—The newest Newark news note is that the newly formed Martin Automobile Company will handle the Mitchell. The DeCamp garage has been taken over and will be refitted.

Reo, Baltimore.—The local agency for the Reo car has been placed with "Little Joe" Weisenfeld, the sporting goods man of this city. The Reo salesrooms are situated on Hanover street.

Chalmers-Detroit, Houston, Tex.—A new automobile firm, Burton & Johnson, has leased quarters at 812 Farnin street, and will have the agency for the Chalmers-Detroit car.

American, Trenton, N. J.—The American Motor Car Company of Indianapolis, Ind., has appointed J. Chauncey Van Horn local agent for the American line of cars.

Dinner on the Top Floor of the Woods Motor Vehicle Company's Factory, to Visiting Tradesmen and Pressmen.



Executive and Selling Force of the Excelsior Supply Company, Enjoying Dinner at Chicago Athletic Association.

Rambler, Dallas, Tex.—The Rambler Automobile Company has established Southern headquarters in Dallas, having built a three-story building at a cost of $75,000.

Kisselkar, Newark, N. J.—The Weldon & Bauer Company has taken the agency for the Kisselkar, which will be handled in this territory in connection with the National.

Rambler, Baltimore.—The Auto Equipment Company, Madison, near North avenue, announces that it has closed for the local agency of the Rambler car.

Maxwell and Stoddard-Dayton, Utica, N. Y.—The Oneida Square Motor Car Company has been appointed agents for the Maxwell and Stoddard-Dayton cars.

Pullman, Boston, Mass.—W. A. Shafer, proprietor of the Crown Motor Car Company, has taken the agency for the Pullman car.

Acme, Chicago.—The George L. Schofield Company has been appointed local agent for the Acme car, made in Reading, Pa.

Studebaker, Philadelphia.—E. Z. Stratton has just assumed charge of the Studebaker branch at 330 North Broad street.

Pullman, Trenton, N. J.—Harry J. Stout has taken the agency for the York, Pa., product in Trenton and vicinity.

Nadall, San Francisco.—The Phoenix Rubber Company has been appointed agent for the Nadall demountable tire.

FISK DINED ITS ARMY.

The Fisk Rubber Company gave during the Chicago show a banquet at the Auditorium Hotel to its agents and branch managers. A novel feature was a set of miniature Fisk bolted-on and removable tires constructed of candy. President H. T. Dunn presided, and the occasion was one long to be remembered.

MAXWELL-BRISCOE ENTERTAIN

The Maxwell-Briscoe Company entertained its army of agents during the Chicago show with a big banquet, which was well attended and at which Maxwell enthusiasm was rampant. Both Benjamin Briscoe and J. D. Maxwell addressed the dealers, and it was no fault of theirs if every man present did not understand the Maxwell car and the Maxwell policy before the end of the evening.

EXCELSIORS HAVE DINNER.

CHICAGO, Feb. 15.—Taking advantage of the presence at the Chicago show of the traveling representatives of the Excelsior Supply Company, F. C. Robie entertained the executive and sales forces of the company at a dinner at the Chicago Athletic Association. The local representatives were:

H. N. Kirk, sales manager of the auto-cycle department; C. C. Boynton, manager of the automobile supply department; F. B. Hart, manager advertising; H. W. Cooper, in charge of the retail selling branch, and F. W. Suter, C. H. McCormick, J. W. Grossmith, E. W. Doliver, H. H. Dewey, of the city sales force.

The traveling representatives present were: F. A. Skinner, of the Pacific Coast; Gideon Haynes, of the Rocky Mountain district; V. B. Mearns, of the "Corn Belt"; J. B. Morrow, of the "Corn Juice" districts, and Fred Wiel, Harry Svensgaard, F. Y. Horn and Jake Meyers, who between them cover the rest of the automobile world.

G. T. Briggs and N. A. Minister represented the factory sales corporation.

The dinner followed an enthusiastic meeting at which prices and policies for the coming year were discussed.

Maxwell-Briscoe Motor Company Dinner, Given at Auditorium Hotel, Chicago, to Maxwell Agents.

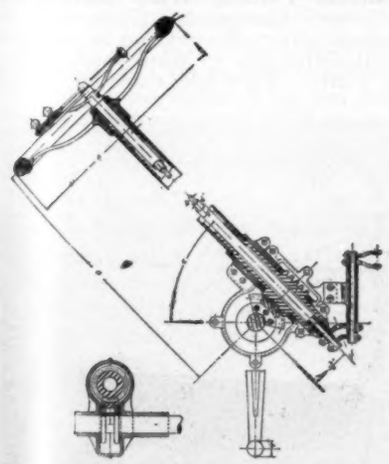
INFORMATION FOR AUTO USERS.

New Gilbert Specialties.—Two new specialties which will interest autoists because of their simplicity and utility are noticed in the advance catalog for 1909, just issued by the Gilbert Manufacturing Company, New Haven, Conn. One of these is the Gilbert pocket tool case, designed to fit flat in the hip pocket. The tools consist of a high-grade oxidized bicycle wrench, baby

GILBERT GAS TANK KEY AND BOTTLE OPENER.

screw driver and combination cutting pliers. The case is of neat design and made of chrome leather. The other article is a very convenient commodity—a gas tank key, with bottle opener attachment. It can be carried on a key ring, and either end is always ready for business. This specialty is furnished in malleable iron, with oxidized copper finish, or in bronze, nickel plated.

Gemmer Steering Gears.—During the coming season the Gemmer Manufacturing Company, Detroit, will produce a very largely increased number of its Model K steering gear, the details of which are shown by the accompanying illustration. This is of the worm and segment type, a ball-thrust bearing being placed above and below the worm to take all strain in the plane of its axis. The ratio is 5½ to 1, a quadruple thread, with a 2-inch lead, being employed, while the teeth of the sector are of 6 pitch. One complete turn of the hand wheel gives a throw of 65 degrees at the steering lever. Instead of being integral



MODEL K GEMMER STEERING GEAR.

with its support, the sector is made separately. All wearing parts are hardened and ground to an accurate fit, and, as a liberal amount of bearing surface has been allowed in every case, there should be little need for adjustment. The control levers are placed on the usual stationary sector over the wheel, the rods passing through the column and terminating in small bevels, meshing with similar pinions on an upright attached to the housing of the gear. This housing is cylindrical in form, and, as the gear is very compact, it takes very little room. The hand wheel consists of an aluminum spider carrying a mahogany rim, different diameter wheels being made to order. The Model K Gemmer steering gear has been specified on a number of well-known American cars for the coming season.

Simplicity the Keynote of Genesee Tires.—Prominent in the list of mechanical clincher tires which may be quickly removed and replaced in an emergency or otherwise is the Genesee. This tire, made by Thomas D. Buick Company, Flint, Mich., has a natural wedge lock which holds it very firmly in place when inflated. If the tire becomes deflated, on the other hand, so that this natural wedging effect would not obtain, it is still held by means of a

CROSS SECTION GENESEE TIRE.

mechanical lock, the valve of the inner tube passing through the wedge-shaped base of the shoe in such a manner as to form a perfect lock. The portion of the latter passing through the felloe is of an enlarged diameter, threaded. A nut pulls it down tight, this being milled for the fingers or pliers to grip upon. The wedging effect, previously spoken of, is obtained by parting the base of the tire, not as usual in the middle, but along a diagonal. Then, each side of the base, with its bead, runs out to a sharp point, when viewed in cross section. In position, these diagonally-parted ends overlap one another, and the inner tube as it is inflated presses upon the upper surface of them at the point of overlapping, thus forcing them apart and jamming them tightly into place against the clincher rim.

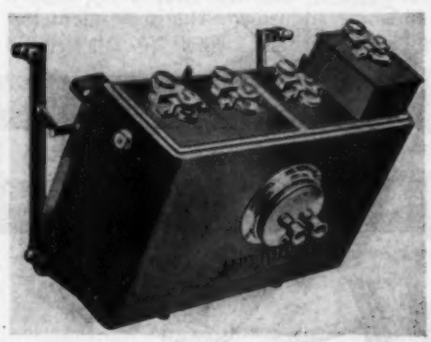
The entire absence of lugs, bolts, or anything else of this nature making as it does for simplicity, is an excellent feature. This is augmented by the manufacturers' guarantee, which extends over 5,000 miles of service. If there was any doubt in the user's mind, the latter feature should convince. This concern manufactures other automobile accessories, among which may be mentioned Mobilene sheet packing for packing all forms of joints, such as gear cases, crank cases, etc., and Genesee lubricating oil, Hi-Lo brand. This is a light-bodied oil for all the year use.

Joyce-Cridland Motor Truck Jack.—It comes as a sad shock to an autoist on the road to discover that no jack is at hand with which to take the weight off the car when it is necessary to do tire repairs. Or, if a jack is at hand and it is the kind which fails to satisfy, it is then

JOYCE-CRIDLAND MOTOR TRUCK JACK.

that the autoist will have to test his temper, and serve as a jack substitute. In view of the fair price at which a Joyce-Cridland can be purchased, it would seem as if the autoist who has to personally supplant an inferior jack becomes a "poor John." The Joyce-Cridland as here illustrated is a screw jack, and more, it has a high lift, and when it is all in it is short enough to stand under. Besides being a screw jack, which stands for ability, this jack is also of the quick return kind. The Joyce-Cridland jacks are made at Dayton, O., and handled in New York City by W. M. Briggs, at 136 Liberty street.

Swinging Coil for Curved Dash.—A coil made especially for use on low dashes with curved tops has been placed upon the market by W. H. Leland & Company, Worcester, Mass., the essen-



WORCESTER SWINGING SPARK COIL.

tial feature of which is its mounting. Swinging brackets are so arranged that they are not in evidence until needed, when the whole four-unit coil can be

swung forward and any units removed without disturbing the underneath wiring. On runabouts and other cars with low dashes this is valuable, while on all cars it can be used advisedly because when the coil box is pulled forward it exposes the commutator wire connections at the back. There is a concealed micrometer adjustment for varying the tension of the vibrator spring, which adjustment is independent of that of the platinum points and reduces the liability of excessive current consumption. The design of the coil is claimed to eliminate buckling and can be used in connection with magneto.

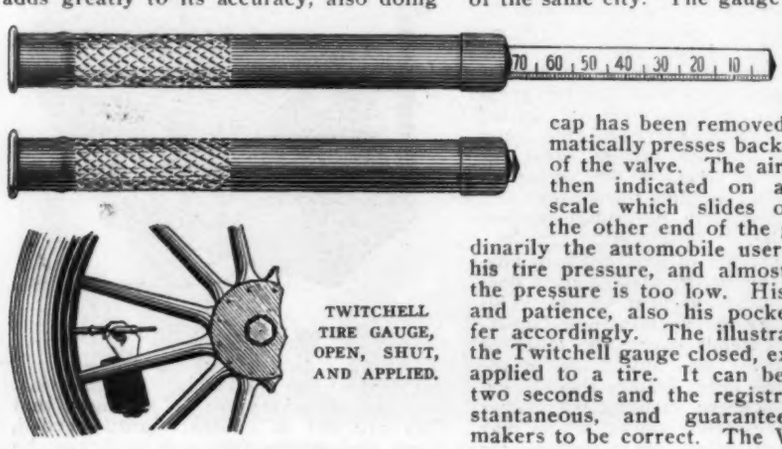
Benford's Monarch Timer.—This new timer, the product of the E. M. Benford Mfg. Co., Mt. Vernon, N. Y., is placed upon the market only after a long and severe test in actual service. It was developed by a practical, experienced mechanic, and its details and working parts are guaranteed by its makers to be absolutely correct and reliable and to be constructed of the best materials that can be found for the purpose. It is so designed that the electrical contacts, terminals and parts are not only well insulated, but they are sturdy. The shell is tight, sufficiently to assure that grease will stay in and dirt will not get in. The timing is precise because the means afforded are of a character to assure the very precision which is necessary to a motor of a plurality of cylinders.

THE NEW MONARCH TIMER.

Connecticut Pocket Meter for 1909.—The Connecticut Telephone and Electric Co., Inc., of Meriden, Conn., has just placed on the market its new type 1909 dead-beat meter for testing batteries. These instruments have many improvements of note over the 1908 style. A new etched metal dial now replaces the paper card dial which is universally used for this purpose, and this dial is not only a handsome addition to the instrument, but adds greatly to its accuracy, also doing away with the common trouble of warping and bulging out, which causes the pointer to stick in taking a reading. The entire interior construction has been changed and is now made up on the deadbeat principle. A new type of pointer construction has also been added. The Connecticut Company is making a great many different styles of pocket battery meters. The volt ammeter is really two instruments in one, the voltage side being used for testing storage batteries, each cell of which should be tested individually, and should show 2.5 volts after the battery is fully charged and still charging, If they show less than 1.7 volts they should be recharged. A storage battery on open circuit when fully charged should show between 2 and 2.2 volts. The ampere side is used for testing the condition of dry batteries, each cell of which should be tested separately, and if any cell shows less than 6 amperes it should be replaced with a new one. This new type of instrument is a worthy addition to the already large line of high-grade Connecticut products.

CONNECTICUT DEAD-BEAT METER.

Twitchell Tire Gauge.—A tire gauge, which is only three and a half inches long, can be carried in the vest pocket and applied at any time, will be a welcome innovation to many automobilists who have been suffering from tire trouble due to insufficient inflation. This description applies to the Twitchell gauge, the invention of C. R. Twitchell, of Los Angeles, Cal., and perfected and controlled by the W. D. Newerf Company, of the same city. The gauge is designed to screw on the valve of the tire, after the cap has been removed; this automatically presses back the plunger of the valve. The air pressure is then indicated on a graduated scale which slides out through the other end of the gauge. Ordinarily the automobile user guesses at his tire pressure, and almost invariably the pressure is too low. His tires, time and patience, also his pocketbook, suffer accordingly. The illustration shows the Twitchell gauge closed, extended and applied to a tire. It can be applied in two seconds and the registration is instantaneous, and guaranteed by the makers to be correct. The W. D. Newerf Rubber Company is arranging to put the Twitchell gauge on the market all over the country from coast to coast.



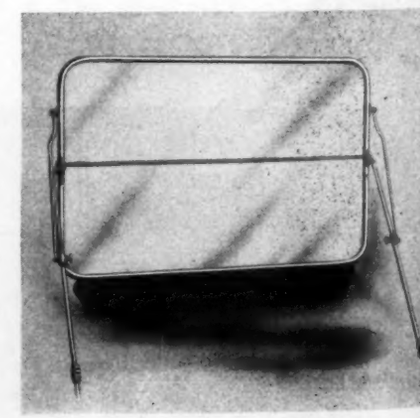
TWITCHELL TIRE GAUGE, OPEN, SHUT, AND APPLIED.

Many Styles of Caloris Bottles.—The great demand for the Caloris bottles which will keep liquids cold in the hottest weather, or hot in the coldest days, without the use of heat or fire, has become so large that the Caloris Manufacturing Company, of Philadelphia, is now putting upon the market several styles of bottles. In addition to those covered with metal and those covered by wicker, a new type of leather covered bottles is being sold known as the "Sterilo" Caloris bottle. This one is arranged so that the glass bottle can be taken from its case and be sterilized, a feature which is very important when used in connection with sickness. Inasmuch as the case is well padded, however, it is also useful where handled very roughly.

CALORIS BOTTLES AND CASE.

There has been perhaps no invention in recent years which has proven such a boon to tourists and others who are out of doors very much or are away from places where hot or cold refreshments may be obtained. Motoring is one of these enjoyments where such is the case, and it is rather seldom now that a party goes upon a long tour without a Caloris equipment. In leather cases two or more bottles can be carried at the same time with as many different liquids. In the new metal covered bottles the bottom is detachable, so that it, too, can be easily taken apart for cleaning, while a spring bowl and leather cushion protect the glass from possible breakage.

Lincoln Folding Wind Shield.—The Bi-Motor Equipment Company, 177 Portland street, Boston, has brought out an attractive line of wind shields under this name. They are made of French plate glass, set in polished brass tubing, with mahogany baseboards. The folding device is claimed to be "so simple that a child can operate it." The shield is guaranteed in every particular, and will fit any make of car. The same company also makes, at a slightly higher price, the "Portland" divided drop shield.



LINCOLN FOLDING WIND SHIELD.